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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

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MEDICINE AND THE MEDICAL AGE.

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ORIGINAL COMMUNICATIONS.

TUBERCULIN IN 1917.

BY EDWARD R. BALDWIN, SARANAC LAKE, N. Y.

Recently it has been observed that tuberculin enthusiasts do not make such exaggerated claims as formerly. This is natural and gratifying. All sorts of fantastic ideas and crude conceptions of tuberculin have had currency from the time of its discovery. Tuberculins have been promoted to produce reactions, and others that would prevent them. Some have claimed to produce immunity by special tuberculins or vaccines made from tubercle bacilli. Still others have inclined to believe that tuberculin lowered the resistance against a reinfection when given long enough to lower sensitive reactions.

It is of course true that ideas about tuberculin have required change from time to time during the development of immunology as a special field of study. Unfortunately such knowledge filters rather slowly into the channels of practical medicine. It is too often of such technical or experimental character as to be inaccessible to the doctor who uses his medicine largely on empirical lines.

Tuberculin is one of the most mysterious medicinal agents used in tuberculosis. It has such a powerful, explosive effect at times, which is fraught with danger, that no little study should be devoted to its action by physicians who use it. It is regrettable that few acquire such knowledge before embarking on the experiment. The consequences of such superficial conceptions as may be prevalent are twofold: either the tuberculin is used too timidly, or too recklessly. In both cases the patient really fails to get a fair deal. The first method has the merit of safety, but normal saline might accomplish as much! The second involves danger of harmful reactions, depressing to the patient and likely to aggravate the disease, more especially lung tuberculosis.

None of the modifications of tuberculin can claim a different action, given sufficient dosage, than the oldest Koch preparations. When they produce no reactions it is because they are of less strength, inert, or slowly taken up. Some preparations are absorbed slowly because in emulsified form. Nevertheless, all are capable of producing the specific reaction to which we are more and more inclined to ascribe the beneficial action when such occurs.

This action which occurs in common from all kinds of tuberculin derived from cultures of the tubercle bacilli must be borne in mind. Whether reactions occur or not is thus a matter of dose, or method of administration, as well as amount and rapidity of absorption.

There is also a paradox in tuberculin effects. If a patient has a high degree of sensitiveness so that minute doses cause local or general reactions, it is sometimes (not always) possible to gradually overcome this condition, in part to the advantage of the patient, by slowly increasing the dosage. At the same time it is very rare that such a method results in insensitiveness to large doses. There remains the danger of sudden, inflammatory reactions with consequences none too pleasant and possibly serious.

The advantage of using such an agent in pulmonary tuberculosis is therefore questionable, yet may be considerable in other forms of the disease. In the pulmonary form there is already too much sensitiveness and the products of the bacilli are too easily absorbed from the lungs. In surgical tuberculosis little absorption occurs as a rule from the focus, and intermittent stimulation by tuberculin may assist materially. Thus in skin, gland, ocular and genito-urinary disease the focal reactions may act quite favorably with little or no danger.

The reactionless treatment by tuberculin is of course indicated for the highly sensitive, pulmonary cases. These cases are few and often unsuitable for tuberculin therapy because febrile, under-nourished, or markedly anemic. The latter are conditions requiring more attention than is usually given to the patient. The nutrition of the patient must be good in order to obtain beneficial results from tuberculin. Otherwise it is quite as likely to do harm if it has any effect.

With a full understanding of the foregoing reasons pro and con it will be noted that the results in pulmonary cases treated with various tuberculins are not brilliant in the moderately advanced classes. Neither are the figures for the permanency of the arrests in this class impressive; nor do the cures of incipient tuberculosis mean notable success for any therapeutic agent when usually other measures of recognized value are combined with it.

On the other hand, localized tuberculosis does present a field for reactive tuberculin treatment where definite absorption and cicatrization of the focus can be promoted. As already mentioned, this may include the skin, mucosa, lymph glands (non-suppurated), the eye and larynx, with localized, partly fibrous lung tuberculosis. The therapy requires reacting doses, such as will affect the focus. Occasionally febrile reactions may ensue. The patient must be told that these are not intentional if the doses are sufficient to produce the focal reaction without them, yet reactions may occur at times and result beneficially.

The above indications for the use of tuberculin may be summed up as follows:

Tuberculin is an agent of limited application with safety when employed in quiescent pulmonary tuberculosis.

It is not immunizing in the sense that relapse is prevented, although it may diminish the number of febrile exacerbations during the course of the disease.

It is contraindicated in active, progressive pulmonary tuberculosis.

It can be used with benefit in reacting doses for certain localized or circumscribed tuberculosis.

RETRODISPLACEMENTS OF THE UTERUS: THEIR CAUSES AND THEIR NON-SURGICAL TREATMENT.

BY E. E. MONTGOMERY, M.D., LL.D., F.A.C.S.,
Professor of Gynecology in the Jefferson Medical College of Philadelphia.

The backward displacements of the uterus consist of version or rotation of the organ on a transverse axis and flexion when the uterus is bent on its own axis. The latter displacement is not infrequently a consequence of the version; for this reason some writers have called it retroversio-flexion. A version may vary from one in which the uterus is in the axis of the vagina to that in which the fundus lies at a lower level than the cervix, and the latter looks upward and forward. Retroflexion in the majority of instances follows a version. When the organ is turned back so that the intra-abdominal pressure is directed against the anterior surface of the fundus, unless the organ is very rigid and firm as a consequence of chronic inflammation, the fundus will be driven down and pushed into the retrouterine pouch, thus causing extreme flexion.

A study of such displacements and the

causes for their occurrence requires some knowledge of the mechanism by which the uterus maintains its place in the pelvis. There has been great diversity of opinion as to the forces by which the uterus maintains its place in the pelvis. Some have assigned the muscular structure forming the pelvic floor or perineum as the essential factor; others have ascribed the uterine ligaments the first place; the peritoneum, aspiration, and the pelvic fascia have had their champions. The truth is that it is not any one but all the factors acting in harmony which have coöperated to maintain the uterus in what is called the normal position. Probably the most essential factor in this work is the endopelvic fascia. This arises from the inner surface of the symphysis, the ramus of the pubes, the surface of the obturator membrane, the white line, and the tip of the coccyx. It covers over the surface of the levator ani muscles, and with them forms the pelvic diaphragm, perforated in the female by the urethra, vagina, and rectum. Its fibers form bands which follow along the bladder on the urethra and extend backward to the front and sides of the vagina and cervix. The posterior portion covers over the rectum and also sends bands to the sides of the vagina. The cervix projects through this structure and is slung by it in the central portion of the pelvis, and its position is maintained by the rather acute axis by which it is thus suspended. In the erect position the organ falls forward and rests on the bladder. The round and broad ligaments do but little more than act as ropes to prevent the very movable uterus being swayed too much out of its customary axis or relation with the pelvis. Just as the aponeurosis of the abdomen is the main resisting force against the formation of hernia reënforced by the elastic muscle fiber of the abdominal muscles, so this fascia is the main factor and is supported by the muscles of the pelvic floor. This fascia as it passes over the posterior surface of the bladder supports that viscus, and its arrangement forms the anterior, posterior, and lateral fornices of the vagina. Injuries of this structure, which are common, lead to the production of the displacements. Injury of the lateral fornices by extensive laceration of the cervix causes lack of support and the production of a displacement. This is seen to affect one side only in a severe laceration of a lateral fornix extending from the cervix into the vagina. Extensive laceration of the pelvic floor promotes the displacement through want of support.

This assertion is sometimes denied and the fact cited that complete laceration of the perineum where no support is afforded does not incline to the production of prolapse and retrodisplacement. In such cases, however, the removal of the resistance from the sphincter ani through the laceration takes away the necessity of straining and effort at stool, and patients so afflicted have less inclination to a malposition. When the laceration extends to but not through the sphincter muscle, the latter is no longer antagonized by the attachment of the levator ani muscles, and the rectum is pushed out through the vagina, forming a rectocele. The want of support and continual straining lead to stretching of the fascia covering the bladder and a cystocele forms. Either or both of these conditions producing continued traction cause the uterus sooner or later to undergo backward displacement. Even where lacerations have not occurred, injuries of the fascia in the vault and sides of the vagina may so weaken its resistance as to permit the sagging backward of the uterus and gradual formation of extensive malposition. Where such displacements are produced in the non-child-bearing woman they are the result of defective formation of the fascia associated with faulty methods of hygiene.

Etiology.—As will readily be appreciated from the previous discussion, the most frequent cause for such displacements is injury during gestation and want of proper care during the puerperium. Lacerations of the cervix, the vagina, and the pelvic floor all have their influence in promoting such displacements through diminished support to

the important structure for maintenance—the endopelvic fascia. This loss of support may occur in the birth canal without visible tearing through overstretching and subsequent atrophy of the fascia. Any condition which leads to enlargement of the organ, as in subinvolution or hypostatic congestion, will favor the development of the lesion under consideration. Other causes have to do with the manner of living. Swung as the uterus is in the pelvis with its body readily movable and resting on the bladder, it will be seen that the continuous neglect to empty the latter viscus will in time lead to the uterus being kept in the line of the pelvic axis, and the intra-abdominal pressure is more and more directed upon its fundus and anterior surface until it is held in a backward position. The same result is produced by accumulation of rectal contents, except that the pressure is then made on the other end of the lever—the cervix. When both bladder and rectum are continually overdistended the uterus is lifted to a higher level in the pelvis and is pushed back.

Dress is an important factor. The habit of wearing the clothing tight leads through the increased intra-abdominal pressure to increased pressure on the pelvic contents, and if there is any disposition of the uterus to become displaced backward the malposition becomes assured. The various infections, whether attendant upon disturbances of the course of pregnancy, its termination, or in non-puerperal cases, are very prone to cause malpositions of the uterus. This inflammation reaches the peritoneum in the majority of instances through the tubes and consequently is found behind the uterus, where adhesions as the result of inflammation fix and draw back the organ. An infection localized in the site of the placenta, when the latter is attached to the anterior wall of the uterine cavity, causes delayed involution in that part of the organ, while the more rapid involution in the posterior wall causes the latter to become the string of the bow and pull the fundus back. The majority of cases of retroflexion, however, are the consequence of previous retroversion in a uterus which has soft, pliable walls, or in other words one in which there is absence of the density and firmness resulting from chronic inflammation. In the latter class there will be marked retroversion without any flexion. It is only when the walls permit of bending that the flexion is produced by downward pressure.

What are the symptoms which should awaken the suspicion that a retrodisplacement exists? There are none which may be said to be due only to this malposition and hence are pathognomonic. Some patients with marked displacement suffer from no symptoms attributable to the condition. The symptoms most frequently associated therewith are a sense of fulness and weight in the pelvis, especially when standing or walking; constipation; hemorrhoids; fissure of the anus; pruritus ani; and a sense of pressure upon the anus. Profuse and continuous leucorrhea and irregular or prolonged menstruation are common. Severe and persistent backache, discomfort in both lower quadrants of the abdomen, especially the left, are frequently experienced. The plexuses of veins about the uterus insure the return of blood from the pelvic organs under adverse circumstances, and it might seem that the position of the organ would have but little influence on its circulation; but the frequency of an enlarged and hypertrophied fundus in association with this malposition makes it evident that the distortion of the broad ligaments as a result of the displacement must exert a marked effect upon the nutrition. This retarded venous return from the organ leads to enlargement, provokes the profuse leucorrhea, and excites prolongation or increase of the menstrual flow. A small uterus would have but little influence upon the action of the large intestine, but when it is readily appreciated that a uterus is enlarged from subinvolution, or the presence of a growth in its fundus, or from chronic inflammation impacted in the pelvis, it is understood how it may cause delay in the evacuation of the bowel. In retroflexion such a uterus almost acts as

a ball-valve, and the greater effort is made to accomplish the evacuation the more effectually is the bowel compressed and closed. The symptoms of distention, pruritus, and fissure are all the result of pressure upon the venous plexuses of the rectum. No woman should be subjected to an operation for hemorrhoids without a careful pelvic examination has been made to see that they are not the result of retrodisplacement or impacted fibroids.

When I began the study of medicine the only treatment for such conditions was mechanical. The tampon and pessary were continually employed. Then a man won a national reputation, not through the introduction of an ingenious operation, but by the invention of a new pessary or by giving an old one a new twist. The common employers of these instruments did not always have a correct idea of their use and could not always give a reason for their efficacy, as was evident by the fact that they sometimes introduced them upside down or wrong end first. They did not always realize they were not curative in the sense that they would correct the malposition of the uterus if they were introduced into the vagina beneath it. The student and physician had to be impressed that they did not correct malposition but only retained the uterus in its correct position when the malposition had been overcome. When they were introduced in cases in which the position could not be corrected because of adhesions, or in which for other causes it had not been effected, they but increased the malposition and aggravated the discomfort. By some all the abnormal symptoms of the pelvic organs were attributed to displacement, and if a malposition were discovered any symptom from which the patient suffered would be ascribed to the baneful effects of the abnormal position. Mechanical measures were then as much abused as surgery is now. The cases in which we can resort to other than surgical measures with hope of affording relief are necessarily limited, but the results achieved are so favorable as to make their study well worth while.

The first consideration should be an accurate diagnosis, not only of the displacement, but of its character, degree, and complications. Nothing must be assumed. This information is secured through a careful investigation and analysis of the history and physical signs. It is unnecessary that I should discuss the method of obtaining what the patient knows of her disorder. The physical signs are secured through the practice of the bimanual examination, preferably vagino-abdominal, but with a finger in the rectum when its introduction into the vagina would be attended with pain or danger of injury to the hymen in the unmarried. This examination should not only enable us to recognize the position of the uterus, but also its mobility, degree of fixation, the presence of growths within its walls or associated with neighboring organs that modify and influence its position, and the readiness with which it can be replaced. With the recognition of a retrodisplacement our minds naturally turn to some mechanical means for its retention in proper position, and a variety of pessaries are brought to consideration. In the employment of a pessary the following dogmas should be fixed in the mind:

1. The pessary should be adapted to the patient and not the patient to the pessary; in other words, it should be fitted and be neither too large nor too small. The size is determined by passing two fingers into the vagina and with them estimating for the length the distance between the promontory of the sacrum and the inner surface of the symphysis. The distance the fingers can be separated will afford an idea of the proper width. The instrument should be molded to the proper curvature and should nowhere make undue pressure.

2. The pessary is used to maintain the uterus in position, not to correct malposition; hence should never be used until the organ has been properly replaced. The instrument does not support the uterus in the sense that it rests against its wall, but through traction on the posterior fornix of the vagina it lifts up the cervix and consequently the fundus—the other end of the

uterine lever—falls forward. The importance of a proper sized pessary can be appreciated; if too short, it fails to exercise accurate support and the uterus falls back over it or the instrument turns in the canal, and the condition is reproduced.

3. The pessary should only be used in recent cases; where the uterus is heavy from subinvolution following labor; or where the process of gestation is endangered.

4. The pessary may be used with advantage in the early stages of pregnancy when the uterus falls back from its increased weight. Here the pessary maintains the uterus in proper position until it can rise above the brim of the pelvis, when support is no longer required.

5. The pessary should always be regarded as a foreign body, and consequently its wearer must be subjected to repeated investigation to see that it is producing no undue effect.

It may be wise to discuss more fully these aphorisms. The selection of a proper pessary was frequently overlooked in the days when pessaries were universally employed. An instrument which was too large produced ulceration and made its subsequent use impossible in cases in which it could have been serviceable because of cicatricial tissue. As the posterior fornix of the vagina becomes shortened from a marked displacement it is often necessary to develop it by the use of tampons before employing a pessary, and as such a condition indicates the displacement is a chronic one it is better to refer such cases to the surgeon for relief. Too small an instrument is useless and may be of discomfort through pressure against the retrodisplaced uterus. As the pessary is useful only to maintain the uterus in its corrected position, it should not be employed when because of adhesions the malposition cannot be corrected. It is contraindicated where the fundus is attached by adhesions to the viscera and walls of the pelvis. The pessary should not be employed in the undilated vagina of the virgin, and it is a crime to dilate the canal for its employment; so that where the condition cannot be corrected by the exercise of hygienic measures the treatment should be surgical. Where the displacement has occurred for a length of time the uterus and its supports undergo changes which render the cure of the condition by mechanical measures impossible, and the pessary should not be considered when it can serve only as a permanent crutch. These are cases in which surgery may be of great advantage. The occurrence of pregnancy in a retrodisplaced uterus may result in impaction of the pregnant uterus within the pelvis unless the condition is early recognized and corrected. The reproduction of the displacement may be prevented by the use of a proper fitting pessary and thus insure the continuation of the pregnancy. As soon as the uterus is sufficiently large to permit it to be supported upon the pelvic brim the instrument has served its purpose and should be removed.

As the pessary is advocated only after replacement of the malposition it is important to determine how this can be accomplished. Formerly it was advised to accomplish replacement by use of an instrument, such as a sound introduced into the canal, but this is no longer considered good practice because it is difficult to prevent the introduction of the infection, which may result in worse conditions than displacement, or render it beyond correction. In the great majority of cases careful bimanual manipulation will effect replacement. Where a large uterus is caught beneath the sacral promontory the patient should assume the knee-chest position, the attendant retract the perineum, seize the cervix with a tenaculum and then carry it backward, when, unless there are adhesions, the organ will fall forward and a pessary can be inserted before the patient changes position. The patient wearing a pessary should be requested to return for examination within a week after its first insertion, but where this is impractical she should be instructed how to remove it should she suffer discomfort. The instrument should be removed

and cleansed at least every four to six weeks during the time it is worn. If douches are administered they should not be medicated with the mineral astringents, for the salts will be deposited on the pessary, roughening its surface and thus increasing its irritation. I have seen the pessary almost completely embedded within the vagina because these precautions were not observed.

Women with adherent uteri are not necessarily victims of the surgeon's knife, especially when recent cases. Unless associated with suppurative conditions they can be relieved by the employment of pelvic massage. The patient being placed in the dorsal position with the limbs flexed, the operator inserts two fingers into the vagina, pushes up and fixes the uterus, which is manipulated with the fingers of the other hand upon the abdomen. This should be done very gently, rotating the fingers over the organ, then pressing them in above, and on the sides pulling upon and stretching the adhesions. Such manipulation may continue for ten minutes, and be followed by the insertion of a cotton and gauze tampon medicated with a glycerin preparation to maintain the stretching of the adhesions. It is well to employ the manipulation daily, or at least on alternate days, to accomplish the most effective results. In recent cases this method of procedure will fit the case for the use of the pessary, or in some cases the absorption of exudate is so effective that the uterus is so reduced in weight that the ligaments are enabled to maintain it in position without other support.

For the young unmarried woman suffering from retrodisplacement much may be done by the employment of hygienic measures. Her clothing should be worn loose and be supported from the shoulders, giving free play to her abdominal muscles. She should be encouraged to take exercise, and for this purpose household duties are beneficial associated with exercise in the open. Sitting in reclining chairs or upon her sacrum should be prohibited. Before retiring and upon arising in the morning she should be directed to assume the knee-chest position, and while in this situation directed to practice deep inspiration and expiration. This procedure pumps the blood out of the pelvis, promotes correction of position by allowing the intestines to get behind the uterus, and with the decreased abdominal pressure favors the decrease in weight of the organ. The bowels should be kept free, avoiding straining at stool, and the precaution must be exercised to avoid overdistention of the bladder. Swimming is good exercise for such patients. It is astonishing what systematic measures as suggested will do for these patients. Local treatment should be religiously avoided in the virgin.

MY PERSONAL EXPERIENCE WITH PERTUSSIS VACCINE IN THE TREATMENT OF WHOOPING-COUGH.

BY EDWARD S. LOGÉ, M.D, MILWAUKEE, WISCONSIN.

I have used the pertussis vaccine (combined) during the last few years in about 100 cases of whooping-cough, with most excellent results, and as a prophylactic, and I consider I have had few failures.

Taking the records of twenty cases in which the vaccine was used, there were only two which apparently did not respond to treatment, after giving it for a period of over four weeks. Ordinarily I would get a response after the second or third dose, and in the majority of cases I did not administer more than five doses (injections) in a period of, say, two weeks.

I have not been able to make any arbitrary, or hard and fast, rules as to the amount used, or as to the intervals between doses. Ordinarily I began with 5 Cc. (½ mil), corresponding to 60 million of bacteria of combined pertussis vaccine. If there be a marked reaction, either local or constitutional, it is considered a contraindi-

cation to an increase in dosage, and I wait a few days for the reaction to subside. With each subsequent injection I increase the dose over the preceding one from .1 to .3 Cc. I never use more than 1 Cc. (1 mil), corresponding to 120,000,000, at one time. I usually give the second dose on the second day, following the initial dose, and the subsequent doses at intervals of three to four days. I have taken as a guide to the dose the severity of the "whoop" rather than the age.

Where children have been exposed to whooping-cough, I have administered the vaccine as a prophylactic and no pertussis has developed.

I have also noticed more satisfactory results if the vaccine is used in the early stages of pertussis; almost always I got an immediate response after the second dose.

The therapeutic results noticed are, that after the second or third injection the paroxysms are not so severe and very much reduced in number. Thus in cases in which the child had eight to ten paroxysms during the night, they were reduced to two after the second injection. No harmful effects have been noted—freedom from complications appearing to be one of the favorable effects of the treatment.

After the paroxysmal "whoops" have disappeared, there sometimes remains a slight cough (bronchitis?) for a week or so, which is of little consequence.

If the vaccine is given in fairly large or ascending doses it brings about a more rapid cure than smaller doses of constant size.

The best results are obtained from the combined vaccine.

My cases comprise patients varying from two months to ten years of age.

In the last few months I have been using the vaccine in adults, but the data are not sufficient to make a report as yet.

The following cases serve to illustrate my results:

Mat. Alex, 4 years old, had been whooping for one week.

Aug. 13/17,	P.	vac.	comb.	.....5 Cc.
Aug. 15/17,	"	"	"	.....7 Cc.
Aug. 18/17,	"	"	"	.....8 Cc.
Aug. 21/17,	"	"	"	.....1 Cc.
Aug. 23/17,	"	"	"	.....1 Cc.

After third injection the whooping ceased. Effective cure.

Frank Alex, 11 months old, had been whooping for six weeks; whooped six times during night.

Aug. 13/17,	P.	vac.	comb.	.....4 Cc.
Aug. 15/17,	"	"	"	.....5 Cc.
Aug. 18/17,	"	"	"	.....7 Cc.
Aug. 21/17,	"	"	"	.....1 Cc.
Aug. 23/17,	"	"	"	.....1 Cc.

After second injection the paroxysms reduced from six times a night to one. Effective cure.

260 Palace Theatre Bldg.

THERAPEUTICS FOR NAVY HOSPITAL CORPS MEN—HOW BLUEJACKETS WHO ATTEND TO UNCLE SAM'S "BINNACLE LIST" ARE INSTRUCTED IN CURATIVE METHODS AT THE UNIVERSITY OF MINNESOTA.

BY WILLARD CONNELY, Minneapolis, Minn.,
Chief Yeoman, U.S.N.R.F.

In training enlisted men who are to serve as assistants at naval hospitals, aboard hospital ships, or in the sick-bays of our dreadnaughts and cruisers, no study is given greater weight and significance than the broad subject of therapeutics. Bluejackets who enroll as hospital apprentices are pointed for the rating of pharmacist's mate. Before they earn that title they must demonstrate unimpeachable knowledge of common principles in the art of healing. A heavy responsibility rests with sailor nurses, particularly in war-time, when the energies of every Navy surgeon are severely taxed, when the degree of help rendered by subordinates is so momentous.

For the first time in history naval hospital apprentices are under training at a medical

college. One hundred men under a project negotiated by Ensign Colby Dodge, U. S. N., of the Minneapolis Naval Training Station, have completed a course of three months at the University of Minnesota and are now ready for active sea duty. All the enriched facilities of the big medical school were placed at the disposal of the Navy. So impressively has the innovation borne fruit that Dean Elias Lyon arranged to train another hundred men, who under the impetus now attained are profiting even more signally than their predecessors.

The breadth of a course in therapeutics, though boiled down to the regretfully short but necessary war period of three months, nevertheless depends largely on the equipment at hand. Happily this department at the university, embracing the correlative subjects of materia medica and pharmacology, leaves nothing to be desired in personnel, apparatus, or amplitude. In making up the outline of scheduled work for the bluejackets it was found possible to give the men not only three morning lectures per week, but a double period of afternoon laboratory work as well—all to be devoted to an intensive grounding in therapeutics.

As to previous education, some of the sailors had had only a year or two of high school, more had completed high school, still others had gone half-way through college, while a few had college degrees. The average was three years in high school, so the medical professors found the navy men pretty responsive, of good understanding, and eager to learn. It happened that these men were all detailed from the Pacific section of the country, where education is daily bread, and every boy eats heartily.

Dr. Arthur Hirschfelder took the class in therapeutics. He put himself immediately in sympathy with the bluejackets by talking strictly from their angle—that is, from a nautical standpoint. Figuratively, he put himself in the sick-bay of a dreadnaught and stayed there three months. He told them how they could use sea water to bring weak bleaching powder up to standard. He explained the importance of examining and testing drugs while the ship is in port. He informed them about trying milk for formaldehyde, using the sulphuric acid and iron chloride reaction which gives the lavender ring if the milk is not the pure article.

To start, the course, which is being repeated with few variations for the second corps of bluejackets, embodies six lectures in chemistry. The first talk, about elements, atoms, molecules, valence, and the nature of physical and chemical changes, is illustrated by demonstration experiments; then a pithy lecture on physico-chemical conceptions, comprising electrolytes and non-electrolytes, relation of acidity and alkalinity to indicators and conduction, colloids and crystalloids. This step naturally leads to the chemistry of carbon compounds —valence, combinations, type products in oxidation of methane, alcohol, aldehyde, acid—concluding with substitutions for the methane molecule.

The fourth lecture gets more particularly into pharmacology, with chemistry of the benzol ring. Under this topic are discussed in succession Kekule's theory, phenol, toluene, benzaldehyde, benzoic acid, and such substitution products as aniline, acetanilide, and the war-famed trinitrotoluene. The two final talks are on the chemistry of the common metals in accordance with their grouping in Mendeleeff's series. The properties of each element are taken up at length in these groups: sodium and potassium, copper, silver, gold; calcium, magnesium, zinc, mercury; aluminum; carbon, silicon, lead; nitrogen, phosphorus, arsenic, antimony, bismuth; oxygen and sulphur; chlorine, bromine, iodine; iron, nickel, platinum.

It is of course tedious for any physician to read such a list, but I am merely giving these details to show the extent of the elementary chemistry with which the sailors are required to be familiar. Their understanding of the more advanced work depends largely on this foundation.

Under general pharmacy, the second part of the course, a beginning is made with metric and apothecaries' weights and measures, common measures, spoons, cups, glass-

es, and the like. Instruction in prescription writing covers symbols and their significance, form of prescription, responsibility of the pharmacist. Then typical liquid mixture, powder, tablet, pill, salve, typical methods of flavoring, disguising tastes and coloring, and incompatibilities.

Since the bluejackets must be able to prepare as well as to administer general and local anesthetics, the lectures are now indeed a record, considering the speedy teaching and the tyro students.

The naval instruction in local anesthesia is mainly devoted to cocaine and novocaine. Effects of cocaine on selective blocking of the nerve trunk are demonstrated, and concurrently are taken up the boiling of the drug and its toxicity. Spinal and infiltration anesthesia conclude the subject.

Under soporifics and sedatives, the opium

The bluejackets proceed to this pharmaceutical laboratory immediately after a lecture. Here they perform experiments bearing on the subject matter under discussion that day.

followed by specific laboratory exercises. The men are well drilled on ether, chloroform and nitrous oxide, the absorption and excretion of anesthetics, their relation to reflexes, signs of anesthesia, concentration of the anesthetic, its dangers, and precautions to be taken. After this much instruction the hospital apprentices were each given a rabbit to etherize, and with only one exception the bluejackets put their animals "under" and brought them "to" successfully. Such an excellent showing is

series and morphine are given prime attention, studied in the light of their pharmacological effects and modes of administration. Subtopics are acute poisoning and chronic morphinism, codeine and heroin, their relation to morphine, and finally the antagonism of atropine and its use with morphine, opium, and papaverine.

"Knockout drops," of which sailors are supposed to be occasional victims, are fully explained and tested, together with chloral from the standpoint of its action on

the brain and circulation. The parallel narcotics of sulphonal, trional, tetronal, paraldehyde, and veronal are next in order of observation, followed by detailed attention to bromides, their mode of action and use in epilepsy and mania. Magnesium sulphate in tetanus and the antagonism of calcium chloride round off this part of the course.

Coming to salicylates and antipyretics, Dr. Hirschfelder demonstrates to the blue-jackets the modes of action of these remedies, their relation to heat radiation and heat center, their uses and abuses, and effect on heart and blood. Emphasis is of course placed on the power of salicylates in rheumatism, their mode of excretion into joints, toxic effects, and salicylism. Supplementing this subject are the essential points about oil of wintergreen, sodium salicylate, and acetyl salicylic acid.

A highly significant and interesting part of the course now ensues under the heading of circulatory stimulants, their modes of action and administration. To start, the men are given a thorough grounding in the physiology of the heart, vasomotor center, and the blood-vessels. Then are taken up the principal drugs acting on vessels, adrenalin and the nitrites. Next is the explanation of how nicotine and tobacco smoke act on ganglia, how ammonia and nitrite act through inhalation, how alcohol, aromatic ammonia, and Hoffmann's anodyne act by reflex from stomach. The use of certain of these drugs for syncope is elaborated. After the lecture on digitalis—its effect on dilated heart, on rapid irregular heart, the mechanism of its action and its scheme of administering and dosage—the doctor had each sailor taste a drop of it on a pipette. They will all indeed remember digitalis. Eggleston's method, dangers, and atropine in digitalis poisoning are given extra attention.

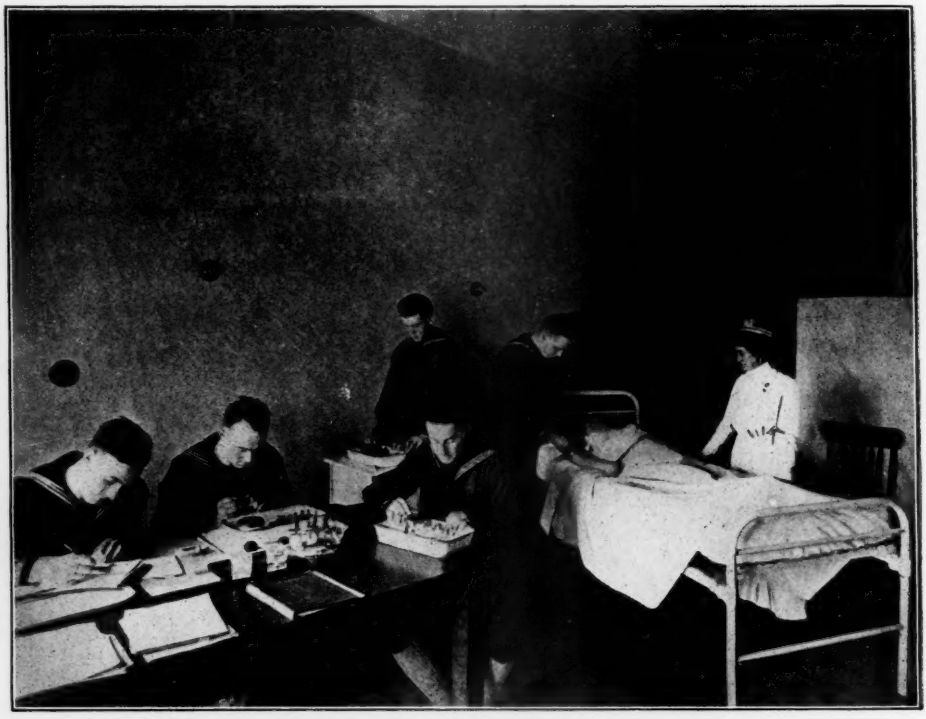
At these demonstrations in the operating-room, the navy hospital apprentices are called upon to take turn about in the therapeutical care of patients.

Among the most instructive of the

laboratory demonstrations on animals is that occurring at this juncture, showing how drugs act on the secretion and hollow viscera, the autonomic and sympathetic nervous system. Truly, it is a fortunate hospital apprentice who, when administering medicine to his patient, can conjure up a picture of just how that drug is going to work internally. He can then nurse the sick and wounded with far greater confidence in his actions, and confidence aplenty he will need if the war goes as long as is generally conceded. In this demonstration the bluejackets in small groups witness the general actions of atropine, pilocarpine, eserine, papaverine, adrenalin, pituitrin, ergot, and their therapeutic effects on pupils, bronchi, stomach, intestines, and uterus.

Because of its anticipated abundant use in seasickness, the administration of atropine for that ailment is exhaustively ingrained in every bluejacket. Thousands of newly-enlisted sailors at sea for the first time now will not escape one or two wilting attacks of the marine malady supreme.

Purgatives are given special consideration, particularly the vegetable and saline purgatives and the vegetable oils. Typical modes of action are studied, the choice of purgatives is exhaustively discussed as a measure apt to be of vital consequence, and ways of giving the dose in typical conditions are explained. A talk on bismuth and antidiarrheal mixtures properly follows.



In the Elliott Memorial Hospital, University of Minnesota Medical College. Having heard a lecture on soporifics and sedatives, the sailors are computing and administering hypodermic doses under the direction of the assistant superintendent of nurses.

Bicarbonate of soda and alkali therapy is the next division of the programme, taking up hypochlorhydria, acidosis and maintenance of neutrality in the body, surgical shock, diabetes, and uremia. To make alkaline urine acid, for example, the doctor requires each navy hospital apprentice to know the simple remedies of acid sodium phosphate and a meat diet.

Under specific therapy, a highly essential

and detailed part of the course, are studied the use of quinine in malaria, ethylhydrocuprein in pneumonia, emetine in abscess; and arsenic poisoning, its occurrence and treatment. Added attention is given to salvarsan and neosalvarsan for syphilis, the action of arsenicals, their effects on the heart and kidneys, means of administration, doses, and dangers. Salvarsan lectures are immediately followed by demonstrations in the dermatology clinic of the university dispensary. A supplementary lecture on mercury covers the history of the metal in medicine, its local and general actions—on mouth, digestive tract, kidneys, and purgatively in syphilis—and its relation to salvarsan.

The final topic is antiseptics. First, the heavy metals are taken up, bichloride, copper sulphate, then formaldehyde, the peroxides, iodine again, the hypochlorites, eusol, Dakin's solution and the Carrel-Dakin treatment, the new dichloramine treatment, and finishing with disinfection of drinking-water. Throughout this phase of the instruction, for the first hundred men previously mentioned, Dr. Hirschfelder repeatedly warned the sailors of the dangers, in applying antiseptics to wounds, of killing the tissues and not the germs. He outlined, however, the wonderful advances which the war has brought about in these methods of healing. The lectures on antiseptics also stressed chemotherapy, including the use of soap, and the desirability of gauze dressings impregnated with soap-suds. These points dovetailed with nicety the training of bluejackets in another course, namely, minor surgery and first aid.

Specialists in therapeutics naturally will observe nothing new in the straight medicinal side of the foregoing. If a missionary wrote for a theologic journal a résumé of those parts of the Bible he had selected to teach his converts, neither would clergymen gain new knowledge of divine truths. But a definite interest remains, attaches, to opening an established indoctrination in a field distinctly apart. Never before have sailors in the U. S. Navy been blessed with the opportunity to learn intensively of the indispensable subject of therapeutics at the hands of a medical college professor and his associates, surrounded by such a wealth of equipment and appurtenances as only a first-grade medical college affords. These bluejackets are going to sea with every bright prospect for speedy promotion to chief pharmacist's mates, and eventually to pharmacists or even chief pharmacists. The University of Minnesota is sending out these sub-alumni knowing each man will reflect worthily on the college whose acquaintance he merely scraped, but scraped safely through antisepsis.

Naval officers of the Minneapolis training station are resolute in their decision to encourage in numerous ways the spread of this national-spirited war concession in the civilian circles of professional medicine.

ALCOHOL AND THERAPEUTICS.

In the *Medical Record* of October 20, 1917, WILLIAMS once more discusses this subject with special reference to the action of the House of Delegates of the American Medical Association. He thinks that this rift in medical harmony would be of little importance if almost any remedy is not merely a medical one, but a political, moral, ethical, financial, and religious one as well. Needless to say, therefore, the action of the House of Delegates has stirred up a tempest, whereas in a less emotional field it would scarcely have caused a ripple.

Roughly speaking, the people who are being directly affected by the action of the House of Delegates fall into one of four groups, namely, physicians, laymen in general, temperance advocates (including both the sincere and the professional types), and the opponents to scientific medicine, most of whom belong to one or another of the "drugless healing" cults.

Curiously enough, the persons whose opinions seem to be least influenced by the action of their official representatives are the members of the first group, the physi-

cians. The reason for this is readily understood. Every physician, even of very limited clinical experience, has had occasion to test the therapeutic effects of alcohol. Mostly he has been able to note what he considers some very definite effects in certain cases. It is what he expects, because the weight of clinical evidence has taught him to expect it. And once this physician has tided a pneumonia case over a critical period with alcohol, or watched its effect upon certain feeble, irregular pulses, as inevitably he will, he is not likely to change his opinion about what he considers the evidence of his own senses. In any event, he is accustomed to "going it alone" in the treatment of his cases; and it will cause him very little perturbation to know that certain officials of his society do not see things as he does.

As far as the layman is concerned, the decision of the House of Delegates is likely to have about as little effect as in the case of the average physician. The layman has had the subject of strong drink hammered into him from so many different angles, and for so long, that for the most part his ideas about it have become ingrained. In any event, if he has any doubt in the matter he will probably ask his family physician about it the next time he sees him, and will be at once set right in the matter.

But the effect produced in the ranks of two other groups of people—the professional prohibitionist and the drugless healing votaries, professional and otherwise—is very, very different. Even before the ink was dry on the announcements of the action of the House of Delegates, the one class was "sharpening her claws and the other fingering its axe helve." Thus Dr. Hare, who did not agree with the opinion of the Council that alcohol was useless in medicine, received a letter from a body interested in "prohibition" even before he could finish his letter stating his opinion, asking him to telegraph the President confirming the statement of the Council. This represents a characteristic attitude of mind of such people, but it is probably merely of pin-prick significance. For "temperance cranks" are so accustomed to juggling alleged facts which have no particular relationship to truth that one additional item is of little consequence.

The really important effect—the thing that will keep cropping out continually, and making its appearance from every legislative angle—is the fact that the "drugless healers" and their followers have been handed an official "jimmy," fashioned very much to their liking. It is now a matter of official record that the whole medical fraternity has been entirely mistaken about the use of one of its most important drugs. Which is precisely what the drugless healers have contended all the time about all drugs.

Make no mistake, this army of drugless healers is far from being a contemptible one [in size.—Ed.]. Its variously ramifying branches, it is estimated, take in one-quarter of the population of this country—twenty-five million scalp-hunters of regular practitioners—who have won pretty decisive [legislative.—Ed.] victories in practically every State in the Union already, and are pressing the fight everywhere. One need not exercise any very great amount of imagination to conceive the use these fighters will make (are making, indeed, at this very moment) of the discord in the ranks of the medical men—the diametrically opposed views about the effects of the oldest and most thoroughly studied drug in the whole category.

It is this disagreement about the effects of alcohol as a therapeutic agent, rather than the actual fact about it, that is unfortunate. If it were a clearly established fact that we had been mistaken about any phase of medicine, the sooner the error was recognized officially the better, regardless of temporary consequences. But in this case the facts are subordinated by the weight of mere official opinions, with the preponderance of evidence indicating that alcohol is indeed a very useful therapeutic agent.

EDITORIAL.

THE INFLUENCE OF CERTAIN DRUGS ON THE FLOW OF BLOOD.

Evidence is constantly accumulating which tends to show that certain drugs, when they are taken by the stomach or administered hypodermically, do not act as direct sedatives or stimulants upon the various functions of the body, but rather that they produce their effects indirectly, by influencing the glands of internal secretion, which being affected create the favorable or unfavorable results which accrue from their administration.

Thirty or forty years ago, when the study of experimental therapeutics may be said to have entered upon its first period of great activity, practically all investigations as to the influence of drugs were, for obvious reasons, which hold as true to-day as they did then, made upon the lower animals. At the present time the majority of the investigations in so-called experimental pharmacology are still made upon the lower animals, varying from investigations as to the influence of drugs upon the isolated organs of the frog or cat to their effects upon the intact animal. In the case of isolated organs there is always the possibility that the unusual surroundings and conditions, even if every precaution is taken, may so influence results as to provide a large factor of error, not only as to what the effect of the drug would be in the intact animal, but a still larger factor of error in determining what the exact effect will be in an intact human being. These experiments, nevertheless, are essential in order that drugs may be physiologically standardized, and also in order that we may obtain elementary, or fundamental, information in regard to the general tendency of their effects, afterward adjusting our conception of their usefulness and value upon the results which are obtained when drugs are given to human beings.

Within the last few years the obvious necessity for gaining additional information has been more than ever recognized, and the use of several forms of scientific apparatus, which can be applied to human beings without deleterious effects, has very properly led to a considerable number of investigations being carried out upon healthy persons. The results so obtained are of importance and of value. In some instances the investigators have reached conclusions entirely opposed to our preconceived ideas of the action of certain remedies when taken as medicines. Thus, it has been claimed that the administration of digitalis, which causes a rise in blood-pressure in the lower animals, fails to produce such a rise in human beings, when the blood-pressure is measured by the ordinary sphygmomanometer. Similar statements have been made in regard to strychnine and camphor, and it is hardly necessary for us to point out that the conclusions reached by experimentalists in regard to the action and value of alcohol have been notoriously at variance with the preconceived ideas of practitioners in regard to its usefulness.

At the present time many more of these researches are required. The ones which have been published have been too limited in their scope and there has been a tendency on the part of the investigators to formulate dogmatic statements, based upon their observations, which are scarcely justified in view of the small number of cases studied and in view of the possibility of error in observation. It is very easy after studying a limited number of human beings under the influence of a drug to promulgate the view that opinions previously held in regard to the influence of a remedy are quite erroneous, the thought being that a few observations made with instruments of precision, so-called, are reliable, whereas clinical observations without such instruments, even when a great number of cases are studied by a large number of observers, are valueless.

It is important that the laboratory and clinico-laboratory investigator shall respect

the views of practitioners, and that practitioners shall respect and study the views and conclusions of the laboratory workers. Until this mutual respect for one another is developed neither type can advance the cause of medicine to the extent which is desirable.

There is still another step in advance which is absolutely essential if our knowledge is going to be increased in a way which will prove definitely valuable to the physician and his patient, and that is the application of instruments of precision and proper doses of remedies, known to have power on human beings, to those who are suffering from the diseases in which clinicians have generally considered that certain drugs are useful. There is an unfortunate tendency to forget that the action of many remedies is often completely changed by the presence of disease. Not only is this true, but that the effects of the same disease are quite widely divergent in different human beings, which, perhaps, explains the various results which are obtained by physicians in numbers of patients when identical drugs are given to all.

In a recent issue of the *Archives of Internal Medicine* Hewlett reports the effects of a number of drugs upon the average blood-flow in the arm of man, the volume and form of the pulse wave entering the arm, and the blood-flow in the main arm arteries during each portion of the pulse cycle. He found that the placing of one or two drops of a one-per-cent solution of nitroglycerin on the tongue resulted in an increase in the size and volume of the pulse, a change toward a more pointed or collapsing pulse, disappearance of the smaller secondary waves, and no marked or constant alteration in the rate of blood-flow through the arm. These results are in general terms just about what we would expect from our previous knowledge of the physiological action of nitroglycerin, for the fall in blood-pressure which it induces results in turn in a larger pulse wave and in the more pointed upstroke, with a quick collapse of the pulse wave due to the comparatively relaxed blood-vessels.

In connection with pituitrin Hewlett found that, if it was given intramuscularly, there was a decrease in the size of pulse volume, a change from a pointed to a more sustained pulse, and some tendency for a transient increase in the blood-flow through the arm. Here, again, these results may be considered as what we would expect from our knowledge of the physiological action of this remedy, but that all human beings do not react in the same way to the same drug even when in health is shown by the fact that while in six cases such changes were marked, in one they were only indicated, and in another absent.

Veratrum viride, however, Hewlett found to be possessed of extraordinary power in the reduction of high blood-pressure, provided it was given in large dose—that is, approximately thirty or more minims of the tincture three or four times a day. Thus, in one case in which the systolic pressure was 200, it fell to 108 in the course of a few hours, but other patients with normal as well as increased blood-pressure proved more resistant to the drug, and in one instance vomiting occurred at a time when no reduction of blood-pressure had taken place. Here, again, we have an illustration of the varying effect of a drug in different human beings in health and in disease. Hewlett found, however, that when a great reduction of blood-pressure occurred under veratrum viride, the disagreeable symptoms which usually accompany a similar reduction by the nitrites did not occur.

Hewlett's observations in regard to atropine are of interest in view of the very general reliance which is placed upon this drug in preventing or combating shock. The doses which he used were large, one-fiftieth of a grain given hypodermically. The patients were normal so far as the cardiovascular apparatus was concerned, but, notwithstanding these large doses, the effects, as measured with his instruments of precision, were not notable. The pulse was accentuated in four instances, seemed to be

slowed in one instance, and there was no effect in another.

Studying strophanthin in seven individuals, presumably healthy as to the cardiovascular system, resulted in finding no striking changes in six of them. The seventh patient, who had auricular fibrillation, reacted with a slowing of the ventricular rate, thereby emphasizing once more what we pointed out in the beginning of this article, namely, the great difference between the action of powerful drugs in health and in disease. In health it did little; in disease it did much.

Camphor, in doses as large as five or ten grains, was given subcutaneously, but no noteworthy alterations in pulse size or form were noted. So, too, adrenalin was given for the relief of asthmatic attacks; the asthmatic attacks were relieved, but no effect in the pulse form was observed. Practically similar negative results were obtained with strychnine, when as much as 1/20 to 1/10 grain was used.

It is impossible to attach too much importance to the matter of the difference between the action of drugs in health and in disease. Aside from the obvious correctness of this proposition a host of instances might be adduced as proving its correctness. The laboratory worker well knows that certain healthy tissues do not stain with dyes which deeply stain diseased tissues. Certain dyes affect cells which have a very copious blood supply, and fail to affect other cells which have a comparatively limited blood supply. An individual in health may take from ten to twenty grains of antipyrine without reducing his temperature more than a fraction of a degree if at all, but if he has a temperature of 103° or 104° such a dose of antipyrine will usually bring it down several degrees, or even below normal. In other words, the very presence of disease, or the very presence of disorder in the heat mechanism, makes this mechanism susceptible to antipyrine, whereas when it is functionating at its normal level it is quite insusceptible.

The invention of numerous instruments of precision, the increased care of patients which is now possible in well-equipped hospitals, and the appreciation of the importance of the factors we have discussed will necessarily lead to further investigation which will throw increased light upon this interesting and important matter. These investigations are all the more to be encouraged because we now have instruments of precision, for studying physiological and pathological change in human beings, which can be applied to those who are ill without materially increasing their discomfort or impairing their progress toward recovery.

The point of interest at the present moment is that physicians should not permit their preconceived ideas in regard to the action of remedies in disease to be disturbed or upset by reports of studies made upon human beings. They should read these reports with care, studying the technique by which the conclusions were arrived at, and check up their own observations thereby. Even when results are reported from the bedside, obtained by means of instruments of precision, facts which seem well established should not be cast aside as unreal until the weight of evidence is so strong that clinical observation must fall before it. The pharmacologist will advance his cause if he avoids dogmatism and the often assumed attitude of superiority. The physician will be a better physician and his patient will be more fortunate if he will read, mark, and inwardly digest the laboratory reports which may be placed before him.

CHANGING VIEWS AS TO THE USE OF QUININE IN MALARIA.

In the August, 1917, issue of the THERAPEUTIC GAZETTE we called attention to several important papers which have been contributed by medical officers of the U. S. Navy advocating the treatment of malarial infection by the intravenous injection of quinine. This method is, of course, by no means new, for many years ago Baccelli of Italy strongly advocated it.

It has been the view of many medical

men, certainly justified by experiments upon animals, that the intravenous injection of quinine was capable of acting as a powerful cardiac depressant, and it is certainly true that when quinine is given intravenously it should be injected very slowly. The reports to which we have just referred indicate that its use in a very large amount of salt solution is not necessary, and that a moderate amount of salt solution is less prone to produce disagreeable symptoms due to the injection of the fluid than large amounts.

The general trend of professional opinion up to within a short time has been that quinine should be administered in full doses shortly before each individual paroxysm or malarial outbreak, or that it should be given immediately after the paroxysm, if the patient is not seen early enough to use it beforehand, with the hope that it will destroy the spores which are circulating in the blood and rapidly attacking new corpuscles. There can be no doubt that this method of administering quinine is correct, but the practice of withholding quinine entirely, except in very small doses between the paroxyms, is being condemned by recent investigation.

In earlier leading articles we have emphasized the fact that one of the disadvantages in administering prophylactic doses of quinine is that the patient may develop a strain of parasites which is immune to the drug, and which, possibly, nothing but neosalvarsan or salvarsan can remove. This probably explains the outbreak of malarial fever when individuals who have been taking small prophylactic doses in the tropics come North and stop their quinine.

A valuable and interesting paper dealing with this whole subject was contributed to the June and July (1917) issues of the *Journal of the Royal Army Medical Corps* by David Thomson. In this contribution he discusses exhaustively the different types of malaria, its clinical diagnosis, diagnosis by microscopic examination of the blood, the course of the disease without quinine and its course with insufficient quinine, the cause of relapse, and the minimum quinine treatment required to obtain a reasonable guarantee of a cure in recent cases, as well as the quinine treatment of malarial cases exhibiting pernicious symptoms such as coma and persistent vomiting. He then goes on to a consideration of the nature and cause of pernicious symptoms, the best method of giving quinine, and a general curative routine treatment. This composes the first part of his paper. The second part we will deal with in a later note.

Thomson states that he has prepared this paper at the suggestion of Sir Ronald Ross in order that the profession might have the advantage of exhaustive and careful researches on the subject carried out at the Liverpool School of Tropical Medicine and elsewhere for a continuous period of nearly four years. It is interesting to note that their conclusions are almost identical with those which have been arrived at by American clinicians in the Panama Canal Zone. Of course, the American investigators have been carrying out their studies during a period of ten years and have treated or studied over a hundred thousand cases, while the cases under study in Liverpool have only numbered about two hundred. The great care taken, however, in studying these two hundred cases renders the results of value, about six thousand blood examinations having been made upon these individuals, the examinations being made several times daily, and careful records of each examination being kept. As the patients of Ross and Thomson were from all over the world, they may be said to represent malarial infection as it occurs in widely separated areas.

It is not proper in a journal devoted to therapeutics to study in detail the whole question of malarial diagnosis. It is appropriate, however, to emphasize the fact that the clinical diagnosis of malaria should always be confirmed by a microscopical examination of the blood, and that in the past, even since microscopic methods of diagnosis have been available, all too frequently

a diagnosis of malaria has been made and quinine administered when other diseases have really been the cause of the temperature. A number of cases of this character are mentioned by Thomson. We must not forget that sepsis produces a swinging temperature, as he calls it, and that liver abscess, pyelitis, pyosalpinx, bronchopneumonia, tuberculosis, and typhoid fever are often mistaken for malarial fever even in tropical countries. Thus, one patient, who had been treated with quinine for three months without effect, was found to be suffering from tropical abscess of the liver. In another case numerous parasites were found in the blood which quickly disappeared under quinine, but sharp, febrile rises continued to occur, and tuberculosis was found to be the underlying factor. In still another anemia was mistaken for malaria, and in one case a patient with acute rheumatic fever was given large doses of quinine without good effect, the diagnosis of rheumatism being made because of the severe pains in the bones and muscles induced by the malarial infection. Thomson emphasizes the point that malignant tertian malaria with pernicious symptoms may simulate almost any disease. Thus, one patient vomited blood and passed blood in his feces, another developed hemiplegia, and still another became blind in one eye due to hemorrhages in the retina. Comatose malaria may simulate alcoholic coma, uremic coma, sunstroke, apoplexy, and chronic cases with considerable anemia and cachexia with splenic enlargement may simulate various forms of anemia, primary and secondary.

It is important to remember that in malignant tertian infection the sporulation of the parasites takes place in the capillaries of the internal viscera, and that for this reason it is much more difficult to make a diagnosis from the peripheral blood than in tertian and quartan infections.

Before proceeding to the therapeutic application of quinine it is interesting to recall the fact, already known but emphasized by Thomson, that in malaria alone do the mononuclear leucocytes contain blackish-brown pigment. This is particularly true in heavy infection in comatose cases. The mononuclear leucocytes are in relative excess, and they are most notably in excess not during the rise but when the temperature is falling, or between paroxysms, when they may be as high as eighty per cent of the total leucocytes. During the paroxysm there is, as a rule, marked leucopenia, often as low as two thousand leucocytes, but the one exception to this is in comatose malaria when enormous leucocytosis occurs, amounting to eighty thousand, or often a hundred thousand white cells. When in a case of fever the polymorphonuclear leucocytes are greatly increased the chances are that the infection is not malaria but sepsis or some other inflammatory process usually characterized by actual leucocytosis. A number of other observers have stated that when the number of mononuclear leucocytes is over fifteen per cent, this is strongly indicative of malarial infection.

Turning to the therapeutic application of quinine, emphasis is put upon the folly of administering insufficient doses, as, for example, five grains of quinine given daily by mouth in solution. This only breeds immune parasites. So, too, even doses as large as thirty grains given daily in solution by the mouth for the insufficient period of seven to ten days is often futile. The point which Thomson is most desirous of emphasizing apparently, to use his own words, is that the "intermittent quinine treatment of malaria is malpractice." In his opinion the patient should receive a continuous course of quinine from the first day he is seen for a period of approximately three weeks, and this is important not only to relieve the individual who is ill but also to destroy the crescents, or sexual parasites, which infect mosquitoes and thereby spread the disease to individuals. Thomson, therefore, thinks that he who gives small doses intermittently is doubly culpable in that he does not cure his patient and does not prevent the spread of the infection.

We intend to further discuss this topic in the April issue.

SURGICAL TREATMENT OF WOUNDED MEN IN ADVANCED UNITS.

Of the many contributions to literature bearing upon this subject few picture as briefly and vividly the conditions encountered, nor has any more clearly indicated what might be called standard treatment for a class of cases all too common, than has Gray (*New York Medical Journal,* Dec. 1, 1917), who on the basis of a varied experience of three years sets forth with the strength of settled conviction what he regards as the best methods of treating the wounded men from the professional point of view.

In commenting upon the civilian surgeon who comes to the front, he notes that the place he takes in the military scale of things, the conditions of his work, the dimly lighted dugout dressing stations, the curtailed facilities, the dust, the wet, the sweat, the mud, the blood, the noise, the bustle, the numbers of wounded, the appalling wounds, the hopeless shock, will open his eyes, test his capacity and resources, and tend to break his heart as never before. Here is no brilliantly lighted and fully equipped theater, here his patients do not come before him in spotless apparel, here he has not unlimited skilled assistance, here no aseptic ritual is possible, here he must be content with very simple things. And through it all he must keep cool, he must hurry, he must be thorough, he must be gentle and careful in every possible way. His is the responsibility to make or mar a man for life.

The surgery of the field ambulance, of the casualty clearing system, of the hospital on the lines of communication in France, and of the base hospitals at home differ widely from each other. Even the most skilful hospital surgeon of civil life must pass through an apprenticeship at any of these places before he becomes of the same value as his house surgeon of three years ago who has qualified in war surgery in France. Even three weeks' experience makes a wonderful difference in one's ideas.

A statement is made at the outset that any attempt to divorce administrative from professional work is fraught with great danger to the success of our calling. It is pointed out that the methods of treatment which are most successful are the simplest and which follow the indications of nature most closely. The man who can land his patient at the next destination in the best condition, with the fewest paraphernalia, has served best his country.

Concerning shock unavoidably aggravated by early handling and transport, rest and warmth are regarded as elements of largest value. The injured part should be fixed and supported in transport. Omnopon, or any similar extract of opium under a different name, is preferable, because the depressing effect is not manifest to anything like the same degree. The patient after having been given a sedative should be kept quiet for at least fifteen minutes until the medicine has had a chance to take effect.

As to the other treatment of shock, the author feels that there is none worth mentioning in the early stages when the patient is first picked up on the field. The Thomas splint in case of fractured femur should be slung in some way on a stretcher. Shock cases should have food and drink in plenty and of an easily digestible nature. Hot tea is a favorite beverage before operation. In severe shock warm drinks should be avoided, since they are usually vomited. Warmth is important. Owing to the number of patients who pour through field ambulances during severe fighting it is usually impossible to do anything for them, excepting what is absolutely necessary to carry them on with the greatest safety to the casualty clearing stations. Arrangements for operations, the splints and dressings used, must be of the simplest form combined with efficiency and must be capable of rapid application. Everything should be practiced in "peace" time on the same plan as is to be carried out in fighting times. Wounds must not be closed by either suture or occlusive dressings until they are subjected to complete surgical procedure. The infection which is carried into these wounds develops

often at such a rate that in a few hours patients may succumb to its virulence. This is prevented by inserting a few layers of gauze, preferably impregnated with some antiseptic. Previous to this, of course, clot and gross infective material should be rapidly removed. The most scrupulous care must be taken that the gauze does not dry and act as a cork. Rifle wounds of small entrance and exit require usually only cleansing of the skin, application of a light dressing, and splinting. In shell wounds the amount of deep damage done can never be accurately estimated. When the foreign body is superficial or readily reached, it may be removed. At the end of the operation the wound should always be wider at its orifice than in the depth. In such wounds "Bipp," recommended by Professor Rutherford Morison, or one of the recently introduced non-poisonous antiseptic pastes, should be smeared on and a fold or two of gauze inserted in the wound. Nor does such a rapid procedure require a general anesthetic other than nitrous oxide.

If a foreign body cannot be felt no attempt at extraction should be made, but it should be located by the *x*-ray, the case being treated as a major operative one at the casualty clearing station. Large, gaping wounds should be cleared of clot and foreign material and lightly packed with gauze and antiseptic solution. The apposition of affected surfaces must be prevented.

Plain sterile gauze is regarded as the best for field dressing. Picric acid, 3 per cent in alcohol, has been found superior to iodine for early application in some cases. Bipp is regarded as wonderfully effective. Pastes made with brilliant green or flavine, chloramine-T, and boric acid have given good results. Watery solutions of antiseptics, such as eusol, Dakin's fluid, etc., have too evanescent an effect to be of great value in a gauze dressing, while Carrel's method of applying them is unsuitable for many reasons. The major precaution in war times is the avoidance of pressure. It is customary to support large flesh wounds with splints even though there be no fracture. The encircling bandage should never make constriction. The dressings should not be changed more frequently than possible. Indications for change of dressings are, first field dressing applied over a board, or disinfecting skin, soaking of the dressing with blood, mud, etc., unsuitable or imperfectly applied splints; too tight bandages which interfere with circulation, causing swelling and pain.

At first-aid posts or dressing stations only such operations as are called for because of an immediate life-threatening emergency, or for the removal of hopelessly smashed limbs, should be undertaken. Under the latter circumstance there should be no attempt to form flaps. The operation for control of hemorrhage may be extremely difficult. A steady oozer is at times as troublesome as an arterial bleeder. After the anesthetic the patient should be kept for twelve hours. For transport of fractures those splints in which it is possible to apply self-contained extension are to be preferred. The best example of this is Thomas's knee splint. The simplest splints are usually the best, and they should be capable of adjustment with the least possible general disturbance of the patient. When fractures are handled a pull on the affected limb should always be kept up so that the fractured surfaces are prevented from rubbing together unduly. It is rarely necessary to administer an anesthetic in setting fractures. To provide the greatest comfort to the patient during transport the following points must be attended to: Adequate extension; adequate support for the wounded part; and prevention of rotary movements. The minimum amount of bandaging must be done so that easy readjustment of the splint is possible. Tapes with buckles are often all that is necessary. Long splints may be prevented from becoming displaced by fixation with the skin. A strip of adhesive plaster around the upper and lower extremity of such a splint will usually suffice. Amputations for fracture at field ambulances should only be done when

vessels and nerves are also destroyed, or if gangrene of the part distal to the fracture has already occurred. In fractures of the humerus, if the small Thomas splint is used, a well-padded anterior and posterior splint should be added for support. For fractures of the shaft, Depage's modified splint is practically always applicable. Jones's extension humerus splint has also been used fairly frequently. If a wound prevents the application of these two, Bowlby's wooden angular splint is then probably as good as any. For fractures at or near the elbow, whether of forearm bones or humerus, the small Thomas splint is the best. For transport or stretcher this splint is bent over the edge of a table or stretcher handle, or is provided with a swivel at the ring. The Thomas splint outfit for the femur consists of (1) Thomas's knee splint; (2) a posterior supporting splint, as Gooch's splinting, a wooden "ham" splint, or Jones's metal gutter splint; (3) a short anterior splint for the thigh; (4) a strong wire foot-piece, for preventing wobbling of the foot; (5) a stretcher suspension bar; (6) one-inch adhesive strapping, bandage, or splint tapes. This has proven the best method of preventing shock and should be used as soon as and whenever possible.

The only occasion in which the action of the Thomas splint is impossible is when the site of the wound corresponds with the back or inner part of the ring of the splint; that is, if a wound of the lower part of the buttock or perineum exists. No other splint or no modification of Thomas's splint has been as successful in bringing these patients in good condition to the casualty clearing stations. Patients with compound fracture of the femur bear handling particularly badly. The death-rate from gunshot fractures of the thigh was at one time of the war about 70 or 80 per cent. Over half of these occurred at the casualty clearing stations. The death-rate at casualty clearing stations during a later period was 15.6 per cent in 1009 cases. In only 5 per cent of those admitted was it impossible to operate immediately because of shock. The Thomas splint is put on without removing the trousers or boots. In attending to a man with a fractured femur the trousers opposite the wound are first cut open freely; the splint is applied and the extension made with a strong calico bandage or puttee before the wound is attended to. The limb is supported behind by the hand of an orderly; the wound is dressed and the supporting posterior splint, well padded so as to flex the knee slightly, is then slung to the side bars of the Thomas splint. An anterior short thigh splint prevents flexion of the upper fragment and gives greater security. The foot-piece is finally fixed in position and prevents wobbling of the foot better than anything else. When the boot has to be removed on account of a wound of the foot, extension may be made by ordinary adhesive plaster strips applied to the leg above the wounds; but when possible, all things considered, a clove hitch around the padded ankle, knot on the outer side, is most suitable.

In order to get at the wound easily, no encircling bandage should be put around the dressings before extension is made, and the necessity for immediate digital compression of the femoral should be borne in mind. The extension must be maintained during transport. The extension should be examined at every stopping place and adjusted if necessary. A posterior long supporting splint is better than interrupted slings. The splint should be slung by two pieces of bandage from the suspension bar. If a suspension bar is not available these bandages may be tied to the traverse of the upper bunk in the ambulance car.

If the suspension bar and the foot-piece are not available at very advanced posts, the projecting end of the Thomas splint should be supported on, for example, a brick, so as to carry the heel free from the stretcher and the foot fixed by a figure-of-eight bandage. If a supporting back splint is not available, the leg of the trousers should be cut down in front and pinned firmly over each side bar of the Thomas

splint. If a patient is picked up on the field, the following device will be found serviceable: A puttee or strong bandage is passed under the perineum and round the head handle of the stretcher on the side opposite to the injury, pulled and tied firmly. A clove hitch is fixed over the ankle and strong extension is made round the foot handle on the same side as the injury. Two or more splints are fixed on the thigh by two strips of bandage or splint tapes.

For those in the upper part of the leg Thomas's splint as applied for fracture of the thigh is the most suitable. For those in the lower part of the leg a long back splint with foot-piece plus two lateral straight splints, which should bear both on the foot-piece and on the back splint, should be applied.

All penetrating wounds should be splinted. In the case of the knee, if the wounds are not accompanied by fracture a straight gutter splint, reaching from the tuber ischii to the heel, is sufficient. More serious wounds, with fractures, should be put up in a Thomas outfit.

In view of the success which has recently attended radical operations, severe chest cases should be sent to the casualty clearing stations as soon as possible. Although not so urgent as abdominal cases, yet delay imperils the success of the operation. Men with open sucking wounds and severe intrapleural hemorrhage may be so collapsed or distressed that they cannot be sent on at once. The closure of an open sucking wound brings about very rapid relief and should be done immediately. This closure is best done by suture, with local anesthetics if necessary; by corking the wound with gauze plug, which is prevented from slipping by adhesive strapping; or by occluding the opening with a broad piece of strapping. Administration of morphine helps such patients greatly. A considerable risk must be taken in sending on many of these cases. The worse the wound the sooner will the patient die if the chest cannot be closed. If suture of a sucking wound is made, a note should always be sent with the patient stating that an open wound of the pleural cavity was present and that the patient requires immediate attention.

It must be continuously borne in mind that wounds of the chest, especially of the lower posterior parts, and wounds of loins or buttocks are frequently associated with penetration of the abdominal cavity. In cases of doubt always treat as if penetration had occurred.

OSTEOARTHRITIS OF THE HIP-JOINT.

This affection, commonly called senile coxalgia, usually regarded as incurable, is of obscure origin, and may exhibit clinically either the proliferative or atrophic type, usually a combination of the two. Surgeons regard these joint affections usually as evidences of chronic infection, metastatic in nature, and originating in the genito-urinary tract; particularly in the teeth and tonsils. A few of the cases undoubtedly date from unrecognized and untreated bone trauma. In many instances a most careful search fails to show an underlying cause. Ozarki (*Boston Medical and Surgical Journal*, November, 1917) reports upon a series of 40 cases of operation upon the hip-joint, of which 26 were instances of osteoarthritis; 23 of the hypertrophic type. The operations included two cases of arthroplasty, two cases of excision of the head of the femur, and usually arthrodesis or an Albee operation for artificial ankylosis.

With few exceptions the operation was performed only in the case of functional or mechanical damage to the joint, accompanied by pain and other symptoms. In these cases surgical interference, especially a successfully performed arthrodesis, seemed to offer the best method for the relief of the disabling condition.

Attention is called to Rovsing's method of injection of sterilized vaselin for the treatment of chronic arthritis; this has proved successful in many cases. Pain, cracking

and stiffness of the joint are relieved in the large percentage of cases a few days after operation. With some there was reaction, with fever, increased pain, and slight swelling. In the hip-joint in adults, 20 to 25 Cc. of the vaselin is the amount preferred. This method has produced a beneficial effect in some of the acute cases. It has not been particularly satisfactory in those cases which have tended to progress intermittently, characterized by intervals of relief between a series of attacks.

In the degenerative type with hypertrophic changes, complete repair of the damaged joints cannot be expected, although in syphilitic osteoarthritis, with much destruction, it is well known that after a natural bony ankylosis the disease ceases. Hence, arthrodesis is one of the most interesting operations to perform, and the most effective in the relief of the disability, especially in the hip-joint.

It must be remembered that operation is only a part of the treatment of osteoarthritis, and that the etiological or general treatment of the case is also important.

Passive motion is contraindicated, as it tends to produce disturbance in the joint and thus hinder the cure. For the same reason, arthroplasty is contraindicated if there is any pathological process on the articular surfaces. Decapitation of the head of the femur may be applicable to cases in which there is immobility of the other hip or knee, in order to restore motion to a stiffened hip-joint.

Arthrodesis has been considered the most advisable operation in the monarticular or traumatic cases.

The lateroposterior route is the one used most frequently for operation. This gives an extensive view of the hip and surrounding structures. The other portion of the trochanter is chiseled off, and with it the attachments of the gluteus medius, gluteus minimus and pyriformis, which are drawn backward and upward. The muscular covering formed by the anterior fibers of the gluteus medius and minimus are easily separated from the region above the acetabular rim. The capsule may be split along its upper surface, parallel to the neck, near to its acetabular insertion, and cut transversely on each side, giving a very good view of the interior of the joint.

In arthrodesis the cartilaginous surfaces of the upper part of the acetabulum and the opposing portion of the head and neck of the bone are completely removed by the chisel, burr, or other instrument. Deep tissues are brought together with catgut, the top of the trochanter being held in place by wire if needful. The limb is put up in plaster-of-Paris spica, in an abducted position, with about 20 to 25 degrees of flexion of the hip and slight flexion of the knee. This spica, which extends from the foot, should include the thigh on the other side.

The patient is kept in recumbency in a long spica for eight weeks. Crutches and a short spica, with no weight-bearing, are used for two months, and crutches with weight-bearing and a bandage spica for one month. Five months after operation the patient may begin weight-bearing without crutches. The patients ranged from young adult life to old age, but the majority had reached or passed middle age. All the cases operated on had a decided degree of disability, due either to repeated attacks of the difficulty or to constant pain, progressive stiffness, or deformity of the hip-joint. Operation was performed on both monoarticular and polyarticular cases. In polyarticular cases various joints were involved. In undertaking any operative procedure it is always necessary to consider the possible involvement of the other joints. If both hips are involved, the motion in one of the hips must be restored by some such operation as decapitation of the head of the femur.

As far as could be determined by examination of the end results, it seems well demonstrated that after arthrodesis if patients have arrived at a stage of disability the leg will be stronger and less troublesome than it was before.

REPORTS ON THERAPEUTIC PROGRESS.

DRUG HABITUATION.

In the *Long Island Medical Journal* for October, 1917, LEAHY, in writing on the treatment of these drug habitués, says so much has been written about this subject that we may state briefly that every physician undoubtedly has his own mode of treatment. Leahy has found that the fairly rapid withdrawal of morphine and heroin gives the best results. He believes that in all of these cases we should start them off first with a thorough evacuation of the alimentary canal. If they show any signs of collapse, place them on stimulating treatment in the nature of strychnine, etc., and if abstinent symptoms are severe in the morphine cases give them at least ¼ grain of morphine for the relief of this condition. Inasmuch as all of the morphine habitués exaggerate greatly the amount of the drug they have been taking, Leahy thinks that we should start them with a small dosage to see what effect this has upon their general condition, and then to increase it very gradually until we find the average dose that will keep the unpleasant symptoms in abeyance. He believes that the drug may be withdrawn in at least a week. For the restlessness and sleeplessness, he thinks that the bromides are probably the best substitutes. In the treatment of the heroin cases Leahy has withdrawn the drug completely and placed them on strychnine and bromide with evacuation, as above outlined, without any unpleasant results. Cocaine may be withdrawn very rapidly without any unpleasant symptoms. There is no special treatment for the bromide case except the complete withdrawal and thorough cleaning out with salines.

The immediate treatment of these cases, Leahy believes, presents the least important side of the problem. He believes that, particularly in the heroin habitué, we have an individual who is subnormal and who will continue to be so regardless as to whether he is a drug habitué or not. He believes that these individuals should be committed to a farm colony for at least three years, and inasmuch as the mental side does not offer any prospects for future development, he thinks that they should be given a thorough course of manual training. After the three-year period, they should then be given a chance to see whether they may make their own way or not, and if this fails they should be returned to the farm for further training. He believes that there is a decided difference between the make-up of a morphine habitué and that of a heroin habitué, although many writers believe that all morphine addicts are psychopathic individuals. While they may have peculiar traits and peculiar make-ups, yet Leahy thinks that the average morphine addict stands upon a much higher plane than the heroin addict does, and this type of individual presents a much more serious problem. If, as some of the later writers believe, all habit-forming drugs are a refuge from internal conflicts, then the problem becomes psychological and psychiatrical. The individual should be analyzed thoroughly; his conflicts, if any, unearthed and thoroughly straightened out if this is possible, and he should be made to feel that the better way of settling the whole difficulty is rather to face his problems than to seek refuge in any form of addiction, be it alcohol or drug.

Leahy believes that the improvement of the physical side of all these patients plays a very important problem in the treatment. He feels that in these individuals, just as with the insane, the general physical condition should be improved, and that the man's mental condition will then be on a much better and healthier plane than if he were in a very poor physical condition. He will furthermore be in shape to withstand temptation to return to the use of the drug.

Leahy believes that the farm colonies offer the best place for the treatment of these cases after the acute symptoms have been treated in a drug ward, and he feels that a great deal can be accomplished by the

establishment of such colonies under the supervision of men who understand not only the medical side, but who also understand individual reactions and characteristics and can discuss each man's problem with him.

THE BANANA AS A FOOD FOR CHILDREN.

To the *American Journal of Diseases of Children* for November, 1917, PEASE and ROSE contribute a valuable analytical article on this topic. They assert that the banana is a useful fruit that can with profit enter liberally into the child's dietary provided it is fully ripe or well cooked. If eaten baked in the yellow stage of ripeness or if eaten raw when fully ripe, the banana makes a delightful and highly nutritious article of food. Its composition does not warrant the use of the banana as the main component of the child's dietary, but it can compete well with other fruits and is decidedly to be preferred to candies. The nutritional value is relatively high, approximately one calorie per gramme of pulp; and its carbohydrates, when it is fully ripe or cooked, are not less assimilable than those of cereals and potatoes. In the raw form the digestibility is directly proportional to the ripeness of the fruit. There is no positive evidence that the banana influences bowel movements.

In the many tests there was no suggestion whatever of any deleterious effect from consuming large amounts of fully ripe bananas. Prolonged use of the underripe fruit, on the other hand, developed undesirable symptoms. Ripeness can be readily determined by the color and texture of the peel. In ripening, the peel changes in color from its original deep green to a dark brown. In this change the color of the banana passes through several yellow stages which are generally taken to be signs of ripeness, but a yellow banana is not necessarily a ripe banana, and if consumed raw while it has a green cast to the yellow color, as is frequently done by children on the streets, the availability of carbohydrates is comparatively low and the effect on the child's digestive system injurious.

The banana ought not to be eaten raw until after the brown spots begin to appear. It is at this stage a full golden-yellow and in its most attractive appearance. A completely browned skin is not in itself a sign of overripeness, and such fruit should be judged by the texture of the pulp. The brown color of the peel, however, should not be confused with the darkening due to bruises. An injured banana is soon invaded by molds and yeast cells both through the abrasions and the broken end; so that the banana "finger" should not be broken from the "hand" or stem cut off in such manner as to leave a good margin between the surface and the pulp. The banana properly handled and allowed to ripen to its most beautiful color and texture is a wholesome food, uncontaminated by dirt and pathogenic germs even if purchased from the push-cart in our congested streets.

INFANTILE SCURVY.

HESS, in the course of an article in the *American Journal of Diseases of Children* for November, 1917, asserts that one of the several factors in the pathogenesis of infantile scurvy is faulty diet. Pasteurized milk was found to be a contributing cause if it was not fresh—if given twenty-four to forty-eight hours after pasteurization. From this point of view milk pasteurized in the city is preferable to milk pasteurized in the country, which reaches the consumer much longer after the heating process. Aging seemed to play a greater rôle in the production of scurvy than heating, whether the milk was pasteurized or raised to the boiling point. It was found that even raw milk on aging loses its antiscorbutic properties.

Infantile scurvy is not, however, a simple dietary disease. The diet is at fault in allowing the intestinal bacteria to elaborate toxins. It is doubtful whether the toxin is always the same, and therefore whether, from a strictly etiologic standpoint, this

disorder should be regarded as an entity. Infantile scurvy is an intestinal intoxication or an autointoxication due to the overgrowth of harmful bacteria in the intestine. It is the product of an unbalanced flora which is no longer controlled by a proper dietary.

One of the striking and important symptoms of scurvy is a susceptibility to infection (furunculosis, nasal diphtheria, "grippe," etc.). Some hemorrhages are due to this secondary infection, and are to be regarded not as scorbutic, but rather as focal complications. Scurvy, however, is essentially a disorder characterized by malnutrition and not by hemorrhage, taking months to develop, and, from a clinical point of view, is frequently latent or subacute.

Infantile scurvy occurring in epidemic form is described. This results when latent scurvy exists among a number of infants and an infectious disease (such as "grippe") is superadded.

THE RELATION OF THE REACTION OF THE URINE TO THE DIET IN INFANTS AND CHILDREN.

In the *American Journal of Diseases of Children* for November, 1917, TORRES makes these points:

1. The difficulties which one often encounters in changing the reaction of the urine in children are very much diminished when a suitable diet is prescribed.

2. Diminishing the amount of protein in the diet to 2 gm. and sometimes to 3 gm. per kilo will often in itself render the urine alkaline without using a drug.

3. In cases in which the amount of protein reaches the lowest physiologic limit without turning the urine alkaline, one may continue to diminish the acidity by adding vegetables to the diet.

4. In older children, with whom the food is more varied, one can do much by regulating the diet.

5. In cases in which vegetables are used to turn the urine alkaline, one must use, if possible, vegetables in which the amount of protein is smaller in proportion to the salts, like fruits, rice, wheat, etc., rather than those which have large amounts of protein like peas, beans, etc. Vegetables which contain purins, like coffee, tea, and cocoa, may increase the acidity, because they may produce uric acid.

6. In cases of infection, especially in infections of the urinary tract, and in cases of starvation, the urine tends to become more acid than in other conditions; therefore it is more difficult to render it alkaline.

7. When drugs are used without the proper diet, the doses necessary to make the urine alkaline are much larger than is ordinarily believed.

8. The action of drugs (either acid or alkaline) is very fleeting; therefore they should be given in large and frequent doses.

THE STATUS OF MEDICINE.

In the *Journal of the Medical Society of New Jersey* for November, 1917, MINOR uses these words:

Medicine is a science, but it is also an art. Were it all science it would not help anybody. Were it all an art, we would wander in all sorts of dangerous channels, led by our dreams and our imagination. It is only when we combine the science and the art of medicine that we begin to get from it what we should. Now, since this is a day when science is so much reverenced, and science at present has its place chiefly in the laboratory, many of our profession would reject all that cannot bring with it laboratory testimonials, and hence the art of therapeutics is suffering severely and we find too few doctors who are successful in bedside treatment or who understand the use of drugs. But we must remember that all the scientific work that many men are doing would be of very little use unless it eventuated in therapeutics. Let us never forget that there is no justification for medicine unless it can cure disease. The investigation may seem very abstract; it may be very far from practical things, at first, but if it leads slowly but surely up to practical therapeutic results it is justified

and is worth while, whereas unless it does so eventuate it is sterile as far as medicine is concerned.

Many of our most useful remedies are purely empirical, though they help us in many a case, but the ultra-scientific men say: "Away with them, they are of no use." That is the greatest folly in the world. If some old woman can convince Minor that something she does seems to have a good effect in the case on hand, he is not ashamed to try it, but he wants to try to find out why the old housewife's remedy is useful. That is the way our therapeutics came about. Take Peruvian bark. The Spanish in Peru were dying with chills and fever; they found the Indians had a drug they could take which cured their chills; it was purely empirical, it had no science in it at all. They got Peruvian bark; they brought it to Europe, and they found it cured chills, though no one knew why, and it saved many lives and cured much sickness. Then in the last century Laveran discovered in the blood of malarial patients a little living bit of protoplasm—the plasmodium; and then Binz, a physiological chemist, showed that the effect of quinine on all types of motile protoplasm was to paralyze and kill it. Then we began to have a scientific basis for the use of the empirical remedy of the Indians in the cure of malaria. Do not let us then, because we wish to be scientific, be arrogant or too quick to reject things whose action we cannot understand, but let us rather try to understand them.

TRANSFUSION AND INJECTION OF BLOOD IN VARIOUS DISEASES OF INFANCY AND CHILDHOOD.

In concluding an article on this subject in the *Southern Practitioner* for November, 1917, PERRY makes these statements:

1. Blood therapy has a wide field of usefulness in diseases of the young. In transfusing children the Lindeman technique is the method of choice. [This is the double syringe method.—ED.]

2. Transfusion offers the best results in hemophilia, purpura hemorrhagica, anemia following traumatic hemorrhages, and the hemorrhages of typhoid fever and diphtheria. Where transfusion cannot be done the next best thing is injection of whole human blood or blood serum. Blood injections are especially indicated in hemorrhagica neonatorum.

3. Transfusions are indicated but usually have only temporary effect in the primary anemias. It is contraindicated in acidosis.

4. Blood therapy should be given a thorough trial in marasmus.

5. The serum treatment of chorea, scarlet fever, poliomyelitis, and erysipelas is still in the experimental stage and the results are not conclusive.

A METHOD FOR THE ALLEVIATION OF EDEMA IN CHRONIC PARENCHYMATOUS NEPHRITIS.

In the *American Journal of the Medical Sciences* for November, 1917, EPSTEIN states the obvious fact that the problem in the treatment of edema in chronic parenchymatous nephritis is to relieve the condition and prevent its recurrence. The mere removal of effusion fluid by paracentesis and puncture, if feasible, may relieve it partly, but does not, as a rule, prevent a reaccumulation. The writer does not dwell upon the medicinal measures used to promote renal activity. The failure of such procedures to influence the edema is classic. It has been shown repeatedly that the kidneys in this type of disease are capable of eliminating the different urinary substances. Their inability to excrete sufficient salt and water is due to causes outside of them.

On the basis of the views presented concerning the causation of edema the real problem in its treatment is the restoration of normal conditions in the blood and the establishment of a healthy state of nutrition. The blood in these cases shows a marked decrease in protein and an increase in lipoids. The indications are: (1) to increase the protein content of the blood and thus help it regain its normal osmotic

power, and (2) to remove or cause the reabsorption by the tissues of the excessive lipoids. The restoration of the protein content may be accomplished by two methods: (1) Massive infusion or transfusion of healthy blood accompanied by the removal of equal quantities of blood from the patient. The latter procedure is necessary to accommodate the introduction of additional blood so as not to embarrass the circulation. It also serves to remove some of the excessive lipoids. (2) Most important is the proper administration of a high protein and fat-poor diet.

The employment of transfusion is undoubtedly helpful and affords a good start in the treatment, but, of course, is not always feasible for obvious reasons. It must be remembered that whereas the replacement of the impoverished blood of the patient with healthy blood helps toward the restoration of normal conditions, the effect is necessarily only a temporary one, for the continuation of the albuminuria causes a constant loss of blood protein. Chief reliance must therefore be placed upon adequate dietetic measures. The method consists, therefore, in the administration of large quantities of properly selected proteins with a minimum of carbohydrates and the exclusion of fats. The reason for restricting the carbohydrates is twofold: (1) to promote a maximum assimilation of protein, and (2) to exclude the greater production and retention of water which is incidental in the metabolism of carbohydrates. The fats are excluded because of the marked increase of fatty substances in the blood.

Diet Employed.

Food value.....	1280 to 2500 calories.
Proteins	120 to 240 grammes.
Fats (unavoidable)	20 to 40 grammes.
Carbohydrates ..	150 to 300 grammes.

Articles Used.

Lean veal, lean ham, whites of eggs, oysters, gelatin, lima beans, lentils, split peas, green peas, mushrooms, rice, oatmeal, bananas, skimmed milk, tea, and cocoa.

As for the administration of fluids and salts, Epstein might say that the fluid allowed is restricted to the quantity present in the food, plus that which is necessary for the comfort of the individual patient, amounting usually to 1200 to 1500 Cc. The amount of salt allowed is the quantity sufficient to make the food palatable.

The method is necessarily slow and requires persistence, but its effect is indeed very salutary. The protein content of the blood increases and the lipoidemia subsides. Accompanying these changes in the blood there is a progressive increase in the excretion of urine with a gradual disappearance of the edema. The albuminuria also diminishes and the patient's health improves steadily.

The diet list above is relatively low in calories; other articles of food are added gradually as conditions allow. The fats are restricted so long as the lipoid content of the blood remains elevated.

The number of cases treated thus far is not large, but such of them as represented extreme types of the disease. The results obtained have been very encouraging. A detailed report of these cases will be published later.

A STUDY OF OIL OF CHENOPODIUM.

To the *Interstate Medical Journal* for October, 1917, ZEIGLER contributes an experimental paper on this subject. He concludes as follows:

1. The oil of chenopodium on the market does not vary in potency.

2. The toxicity is not influenced by the age of the animal.

3. The absorption is more rapid from the stomach than from the intestines.

4. Atropine antagonizes the depressant effect upon the respiration.

5. Small doses are non-toxic.

6. When oil of chenopodium is administered to dogs in salol-coated capsules, the absorption is delayed.

7. The cause of death in the dog when oil of chenopodium is administered in toxic doses is an acute diffuse nephritis.

8. The failure to differentiate between drops and minims, and the failure to follow therapeutic doses with a purge, are probably the principal causes of the fatal effects seen in several cases of uncinariasis treated with this drug.

COLON BACILLUS PYELITIS CONSIDERED WITH REFERENCE TO CASES IN BOY SUBJECTS.

GRAVES in the *American Journal of the Medical Sciences* for November, 1917, says that three principal methods of attacking deeply seated colon bacillus infections of the urinary tract have been recommended: the administration of drugs excreted in the form of urinary antiseptics, the giving of alkali in some form, and the injection of colon bacillus vaccine.

Of the so-called urinary antiseptics hexamethylenamine alone has gained extensive use in pyelitis. This drug, however, has repeatedly been shown to be without inhibitory or bactericidal action except by virtue of its liberation of formaldehyde, a chemical change occurring only in an acid medium.

For this reason it is customary to administer acid sodium phosphate separately while the hexamethylenamine is given, in order to render the urine strongly acid. Burnam's test for formaldehyde has been perfected, with a view of determining actually how much is liberated under dosage with various quantities of hexamethylenamine, and a number of investigators have studied the bactericidal effects of the formaldehyde thus secreted.

Levy and Strauss came to the following conclusions:

"Hexamethylenamine *per se* in neutral solutions in concentrations up to 1 to 10 is neither inhibitory nor bactericidal.

"Formaldehyde is formed only in the bladder in all cases except in those cases in which the acidity of the urine is higher than normal. In these cases some formaldehyde is formed in the kidneys.

"The strength necessary to inhibit the growth of the colon bacillus is a concentration of 1 to 500 or greater.

"Under a dose of 7 grains three times daily formaldehyde is never present in concentrations greater than 1 to 5000.

"The only organism destroyed or inhibited in growth by this concentration is the typhoid bacillus.

"For the destruction or inhibition of other organisms a high acidity is necessary, and this high acidity in combination with formaldehyde may produce injury of kidney tissue."

Burnam, L'Esperance, and Jenness likewise studied the excretion of formaldehyde and found that not over 60 per cent of all adults are capable of breaking down urotropin even under dosage of 30 to 100 grains; but in conjunction with their findings must be recorded the observations of Talbot and Sisson, who investigated the secretion of urotropin in 44 children and infants and found that although large doses combined with the maintenance of a high degree of acidity of the urine were often necessary, nevertheless all of the children excreted the formaldehyde.

Numerous investigators, moreover, have remarked hematuria under what was considered therapeutic dosage.

Before passing final judgment upon this mode of treatment, however, the clinician must give due attention to such experience as that of Freeman. He gave as much as 45 grains of hexamethylenamine daily to a child of one year, 35 grains to an infant of nine months, and 5 grains to one of six months, with curative effects, notwithstanding the fact that in every instance other treatment had been employed without avail.

It has been shown that the ingestion of colon bacilli by leucocytes is most active in an alkaline medium, and this fact, coupled with recognition of the predilection of bacillus coli for acid media, gives ground to the tenet that an alkaline reaction is favorable to the subsidence of pyelitis. Accordingly, advocates of treatment based on this theory have emphasized the need of administering potassium or sodium citrate

or a similar salt in dosage sufficiently large and frequent not only to produce but constantly maintain alkalinity of the urine. Still emphasizes the importance of administering this treatment without interruption at intervals not to exceed three hours even during the time allotted to sleep. In obstinate cases he prescribes also salol. Such beverages as Vichy and lemonade are of obvious value, and the influence of the diet upon the urine reaction is by no means to be forgotten, preference being given to fruit, milk, and vegetables rather than to meat, eggs, and bread.

Many physicians who admit the possibility of ill effects from hexamethylenamine report good results gained by alternating a course of this drug not exceeding a week, with the administration of the alkali for an equivalent period.

Geraghty reports no improvement attributable to autogenous vaccine in any one of 13 adult cases. Chapin and Pisek state that the results from vaccine therapy are very good in colon bacillus infections, but that it is practically impossible to cause a total disappearance of pus and bacilli. Hugh Cabot has stated that vaccines produce improvement in urinary infections in more than half the cases. These few expressions are respectively typical of many others and serve sufficiently to emphasize the variance of view in this matter. The facility, however, with which the particular strain in a given case may be isolated renders the preparation of autogenous vaccine relatively simple and contributes to the justification for its use in all persistent cases. Initial doses ranging from 10,000,000 to 30,000,000 organisms are recommended, and the rapidity of increase and ultimate limitation of the dosage are to be determined by the behavior of the case. Considerable temperature reactions with constitutional disturbances such as occur after immunizing injections of typhoid vaccine are not regarded as cause for discontinuing this treatment provided large and rapidly increasing doses are avoided.

The possibility of developing a method of ureteral catheterization to such a degree as to permit the instillation of antiseptic solutions into the pelvis of the kidney in cases of pyelitis in children rests with the genito-urinary specialist. In the female subject the mechanical difficulties attending such procedure are by no means so great as to discourage trial of this method in expert hands in special instances. Thus far the excellent results obtained from this form of treatment have been practically limited to selected chronic cases in adults.

Notwithstanding the fact that there is apparently no reason why absorption and metastasis of bacteria from the intestinal tract may not continue long after the onset of renal infection, few writers emphasize the importance of systematic attack of this primary focus. Colonic irrigations and adequate catharsis are of great value, and of no less value is the maintenance of an easily digested diet combined with the giving of cultures of bacillus bulgaricus or regular doses of salol.

Any of the special methods should always be supplemented by general measures to combat malnutrition and secondary anemia, as in the case of tuberculosis. An outdoor life with such play as involves only light exercise does most to insure against relapses during the period of convalescence.

Urinary infection caused by the colon bacillus has been shown to be a common and important disease affecting female children. Pyelitis in boys, although far more infrequent, is, from the standpoint of the individual case, possibly even more important.

In the male subject the possibility of extension of infection through the lumen of the urethra may be excluded, and in the treatment of *all* cases the intestine is to be recognized and dealt with as the potential source of the disease.

The possibility of the occurrence of unusual and severe systemic manifestations in well-developed pyelitis should be better appreciated.

The best routine treatment for pyelitis in children is the administration of suf-

ficient alkali to render the urine alkaline and maintain this reaction.

If hexamethylenamine is employed the formaldehyde excretion should be watched and the urine should be examined frequently, with a view of forestalling injurious effects upon the kidney parenchyma.

In all obstinate cases autogenous vaccine should receive a thorough trial.

A REVIEW OF 280 TRANSFUSIONS.

MELENEY and three associates reach these conclusions in the *American Journal of the Medical Sciences* for November, 1917:

1. Transfusion is of real value in cases of hemorrhage, in clean operative cases, in pernicious anemia, and in some secondary anemias. It is of little or no value in septic operative cases, cases of bacteremia, or cases of acute leukemia.

2. The sodium citrate method of transfusion is a very simple and satisfactory method. A dilution of citrate up to 0.5 per cent in 1000 Cc. of blood can be used without producing toxic symptoms in an adult, and that dilution prevents clotting better than a dilution of 0.2 per cent.

3. Blood grouping should always be carried out before a transfusion. Where a reliable laboratory is at hand the direct grouping of donor and recipient is not necessary, but otherwise should always be performed. Failure to determine the compatibility of the bloods may result in the sudden death of the patient.

4. Post-transfusion reactions occurred in 63.6 per cent of the cases in this series, the reactions varying greatly in degree, but all being evidenced by a rise of temperature to 100° or more.

5. The recipient in good general condition is much more likely to have a reaction than the one in poor condition.

6. The method of transfusion, the blood relationship of donor and recipient, and the blood group of the recipient seem to have nothing to do with the occurrence of the reaction.

7. Transfusions of small amounts of blood—*i.e.*, less than 200 Cc.—are less likely to be followed by reactions than are transfusions of larger amounts.

8. The more transfusions a patient is given the more likely he is to have a reaction, especially if the same donor is used a large number of times. The blood of some donors is more likely to cause reactions than the blood of others.

9. In some cases the post-transfusion reaction is accompanied by a marked polymorphonuclear leucocytosis. Whether this is due to intravascular hemolysis or to the formation of a toxic product from the partial splitting of a foreign protein cannot at present be stated. It seems most likely, however, that one of these phenomena is probably responsible for most post-transfusion reactions.

PREPARATION AND METHOD OF USING TOXIN-ANTITOXIN MIXTURES FOR ACTIVE IMMUNIZATION AGAINST DIPHTHERIA.

In the *Journal of Infectious Diseases* for November, 1917, ZINGHER, who has done much good work along these lines, tells us that the indications for active immunization with toxin-antitoxin may be divided into two groups: (*a*) as a general prophylactic measure, and (*b*) to control outbreaks of diphtheria.

The most suitable age for prophylactic immunization is between six and eighteen months. At this time of life nearly all children are susceptible to diphtheria. While only 15 per cent give a positive Schick test at birth, almost all the remaining children lose their maternal immunity after the sixth to ninth month of life and then show a positive Schick reaction. It is, therefore, a safe and convenient rule to follow to immunize with toxin-antitoxin all children below eighteen months of age irrespective of the Schick test they may show at the time of immunization.

There are several advantages in this procedure. First, by omitting the Schick test

in this group of children, the immunization will be greatly simplified and more readily applied by the large majority of general practitioners. Secondly, the local reaction after the toxin-antitoxin in young children is very slight or absent. Third, the morbidity and mortality from diphtheria is greatest between one and four years of age; therefore an early immunization on a large scale of young children is of great importance in controlling the disease. Fourth, the immunity which develops after injections of toxin-antitoxin is an active immunity, that persists for several years and possibly for life.

After the age of eighteen months it is of advantage to apply the Schick test first, so as to exclude from inmunization those children who show a negative reaction and are probably permanently immune. Young children can be reached in the homes, in infant asylums, in the milk stations, and in day nurseries. The children of the next age period are included in the preschool and school groups. These children may be reached in the public schools, in orphan asylums, and in the various other institutions. Among adults, those who come in contact with diphtheria and are constantly exposed and in danger should also be tested and immunized with toxin-antitoxin, if found to give a positive Schick reaction. Included in this group are especially physicians, nurses, and hospital attendants in contagious-disease hospitals.

The immunity developing from toxin-antitoxin is slow in appearing, and is, therefore, not a reliable safeguard in hospital wards where children are crowded together, and suffering from various contagious diseases. But in institutions where small outbreaks of diphtheria have occurred, or where diphtheria is more or less constantly present and clinical cases and bacillus carriers steadily appear, the use of antitoxin alone has often been inefficient to stamp out the disease, and the combined application of the Schick test and active immunization with toxin-antitoxin has given most successful and encouraging results.

CONDEMNATION OF BIOPSY.

The *Medical Record* of October 27, 1917, reminds us that in January, 1917, the Cancer Commission of Harvard University rather unwisely offered to supply the medical profession of Massachusetts the services of its laboratory for the free diagnosis of cancer tissue. This was in accordance with the movement so unaccountably started by the American Society for the Control of Cancer, some members of which have time and again exposed the dangers of such a practice. The society seems to have acted solely on the recommendation of a committee consisting of three distinguished pathologists, without surgical experience, who made a report in favor of this procedure. The suggestion of the committee was most unfortunate, for, as might have been anticipated, it was ignorantly acted upon by a number of bodies composed of laboratory workers, internists, or others, whose very little surgical knowledge proved to be a most dangerous thing. Among these was the New York City Health Commissioner, who issued an invitation to the medical profession to bring to the department laboratory for diagnosis slices of suspicious tumors of the breast and other parts. The suggestion seemed so horrible that the *Medical Record* at once cried out against it and warned its readers of the fearful danger to which they would expose their patients if they acted upon the Health Commissioner's urging, and the *Medical Record* returned to the matter again and again at the risk of tiring their readers, for the thought of the certain death to which so many trusting women would be hastened unless the Commissioner withdrew his invitation would not be stilled.

Commissioner Emerson has not yet withdrawn his invitation; indeed, he recently published a report stating that 104 specimens were submitted to the laboratory up to July 1. "The majority of the specimens received," the Commissioner says, "have been tumors taken in part or *in toto* from various parts of the body, and a diagnosis of malignancy has been made in a good

number of cases in which the diagnosis had been uncertain, prior to microscopic examination." It is heartrending to think of the fate of those victims from whom the tumors, afterward diagnosed as malignant, were taken "in part," for their speedy and painful death is as certain as anything can be in medicine.

THE INTRAVENOUS ADMINISTRATION OF QUININE BIHYDROCHLORIDE IN MALARIA.

JAMES in the *Journal of the Royal Army Medical Corps* for September, 1917, selected for this mode of treatment certain patients in whom vigorous courses of quinine treatment. by the mouth and intramuscularly, had failed to prevent the recurrence of relapses, either very shortly after the cessation of the treatments, or, in one or two cases, actually during their progress. His chief purpose was to ascertain whether, in this difficult class of case, a course of quinine given intravenously would be more effective in preventing relapses than the other modes of administering the drug.

All the patients selected had contracted the disease about eight months before the beginning of their present treatments; and, during the frequent relapses from which they suffered while in the Manor War Hospital, the parasites of benign tertian malaria were the only ones found. But the medical history sheet of one patient contains a record that malignant tertian parasites were found during his stay in another hospital.

In all cases the intravenous treatments were begun at the time of rigor while parasites were present in the peripheral blood: and in all cases it was the rule that, after the completion of the course of treatment, no quinine should be given until a new relapse of the disease occurred.

Cases in which patients received only one intravenous dose of quinine (followed as a rule by a course of oral administration) are omitted from the tabular statement; but a number of patients were treated in this manner with the chief object of ascertaining the smallest dose of quinine which, when given intravenously, would suffice to cause the disappearance from the peripheral blood of all the asexual parasites of a given generation. Stated in general terms James's experience on this point was that:

1. A single dose of six grains of quinine bihydrochloride given intravenously at the time of rigor caused a marked reduction, but by no means a complete disappearance, of all the asexual parasites of the generation which caused the rigor.

2. A single dose of nine grains in the same conditions sometimes effected, but sometimes failed to effect, the complete disappearance of all the asexual parasites of the generation which caused the rigor.

3. A single dose of fifteen grains given intravenously at the time of rigor invariably caused the disappearance of all the asexual parasites which caused the rigor; but

4. The same dose given on the day of interval between two paroxysms did not effect a complete disappearance.

5. When two or more generations of parasites were present, it was necessary, in order to insure the disappearance of all asexual parasites from the peripheral blood, to repeat the intravenous dose of fifteen grains at such times as would insure the presence of quinine in the blood while the parasites of the different generations were sporulating.

As regards the rapidity with which a sufficient dose administered intravenously caused the disappearance of asexual parasites from the peripheral blood, a marked reduction in numbers was easily appreciable six hours after the administration, and disappearance was as a rule complete eighteen hours after the administration.

7. As regards the effect upon *sexual* forms of the parasite, a single dose of fifteen grains did not appear to lessen appreciably the number present in the peripheral blood; and it will be seen from the tabular statement that, in ordinary thin films of

finger blood from two patients who had received a daily dose of fifteen grains intravenously for four days, gametocytes could still be found without prolonged search.

RECENT TREATMENT OF LOBAR PNEUMONIA.

LEEN in the *Boston Medical and Surgical Journal* of February 21, 1918, asks the question, Is there a medicine that acts specifically in the disease as salvarsan does in syphilis, and quinine in malaria? Morgenroth and his associates, in 1911, while working on various organic quinines, discovered that one of them, ethylhydrocuprein or optochin, exerted some protective and curative action on mice infected with pneumococci, and that in the test-tube, in weak solutions, these organisms were destroyed. With this as a basis, much progress has been made since grouping of the pneumococci was determined. Moore and Chesney have reported 32 cases treated at the Rockefeller Hospital in conjunction with allied experimental work. To cure pneumonia or pneumococcal septicemia with this drug, there must be produced a pneumococcidal action in the blood serum, to maintain it as constantly as possible over a period of time sufficiently long to insure the destruction of all the infecting pneumococci, and the concentration of the drug in the body to be harmless to any part of it. These have been pretty well fulfilled. It has a positive bactericidal action on the organisms in the blood, and should be given as early as possible in the disease on account of the fewer organisms in the blood. But those in the lung lesions apparently are not affected, as they are mechanically protected by the exudate from the action of the blood. The dose must be large at first to prevent the organisms from acquiring a condition of resistance or "fastness" to the drug, which, if occurring, makes later large doses of no avail. This has been shown experimentally to be so, for cultures, by slowly increasing doses from ten to twelve days, could grow in comparatively high concentration from the drug. The best method of administration is by the mouth, as doses so small as to have little bactericidal action when given intravenously cause serious toxic symptoms, and subcutaneous doses cause much discomfort by painful infiltration of the tissues. Optochin hydrochloride (Merck) given by mouth in capsules is absorbed so quickly that there is a rapid appearance of the bactericidal action in the serum. For the average person of 135 pounds (62 kgm.), 1.5 grammes (25 grains) should be given in twenty-four hours to cause bactericidal action; or at least 0.024 gm. (grain 1/3) per kilo of body weight per twenty-four hours. The first day an initial dose of 0.45 gm. (grains 7½), and every three-hour interval thereafter 0.15 gm. (grains 2½), for seven doses; and subsequent days, ten doses of 0.15 gm., each at 2½-hour intervals. Camphor has been shown to diminish the curative effect of optochin and should not be used. No particular diet is necessary.

Optochin is a white powder, soluble in distilled water, but not in salt solution. Experimentally it has been found that 3½ hours after giving 0.5 gm. of the drug it is possible to detect the specific inhibitory action in the patient's blood: it is absorbed faster than it is eliminated in the urine and there results a positive balance in the body. Fluid aspirated after death from a pericardial sac was found to be sterile and to have a bactericidal action on pneumococci, showing it passes through serous surfaces. On account of lack of knowledge of its proper dosage, some serious toxic symptoms were reported, but recently they have been minimized to a great degree. They are principally referable to the eye and ear. Vomiting has been reported, due probably to the extremely bitter taste. Ringing and roaring sounds in the ears, and partial deafness, transient in type, disappear when the drug is stopped. The eye symptoms are more serious, and out of 787 treated cases which have been reported, 4½ per cent have had transient amblyopia or amaurosis. Oliver reports one case of permanent, almost complete blindness, the patient receiv-

ing 5 grains (0.3 gm.) every three hours, the total amount being 7.7 gm., greater doses than that usually given. In all other reported eye changes, discontinuance of the drug cleared up the symptoms. Dilatation of the pupils, suggesting some amblyopia, should be watched for, and it is important that ophthalmoscopic examination be done often to determine any eye changes, and if any are found the drug should be diminished or discontinued. The more the daily dose is subdivided, the less frequent are the visual disturbances.

Leschke and others report favorable results from optochin treatment in pneumococcal septicemia. At Rockefeller there was no considerable shortening of duration of the disease under its use. In 787 reported cases treated with the drug there was a mortality of 12.96 per cent, and in Moore and Chesney's corrected series 19 per cent, where the mortality expected was calculated to be 33 per cent. In all these cases empyema occurred in 1.9 per cent. These figures are encouraging, and even if the drug can't destroy all the pneumococci in the infected area when present in the blood in a concentration sufficient to produce bactericidal action in the serum *in vitro,* nevertheless, if it can prevent a spread of the disease process to healthy lung and prevent septicemia, or metastatic complication, its use may be helpful, as the involvement of hitherto healthy lung constitutes great danger to the patient.

The use of optochin and antipneumococcus serum simultaneously in Group II pneumonias, since the serum alone was disappointing, has been shown by Moore to give markedly increased protective value to the serum. This would seem to suggest that in the specific treatment of pneumonia, perhaps even more favorable results may be expected from the use of optochin and the type of homologous antiserum than by either of these remedies separately. Time and experience may make us change the dosage and value of this drug, but to repeat the statistics as quoted, of 787 cases of lobar pneumonia treated with it, with a mortality of 12.96 per cent, with an expected mortality of 30 per cent, surely makes it worth while for our study and consideration. Furthermore, Cole's recent report of 72 consecutive cases of Group I pneumonia treated with a corresponding serum intravenously, with a mortality of 8.3 per cent, whereas among untreated patients in this group the death-rate was 25 per cent, bodes well for the future cure of this most important infection. There are many other questions in pneumonia which could be discussed from recent literature with great profit.

ACUTE LOBAR PNEUMONIA.

In the *Boston Medical and Surgical Journal* of February 21, 1918, SHATTUCK and LAWRENCE after an exhaustive analysis of many cases reach these conclusions:

1. In the four thousand odd cases of lobar pneumonia treated at the Massachusetts General Hospital, from 1822 to 1917 (inclusive), the mortality has gradually increased from 10 per cent in the first decade to 28 per cent at the present time.

2. Since 1881 there has been no significant change in the death-rate.

3. The number of cases classed as delicate or intemperate has been decreasing during the same period.

4. The apparent increase in complicated cases is probably due to increased accuracy of diagnosis and recording.

5. The relative number of foreign-born patients is increasing, the mortality among them diminishing.

6. The death-rate among the American-born has increased slightly, as has the mortality among men as compared to women. This may be due to a corresponding increase in vascular diseases during the period studied.

7. The mortality rate for pneumonia in the entire series has shown no permanent important change.

8. Treatment has done nothing toward diminishing the mortality from pneumonia in the past ninety-five years. Bleeding,

purging, fresh air—the result has been the same. Of particular interest is the evidence offered by the writers' figures upon the effect of alcohol. Its habitual use, during health, in more than moderate amounts, is shown to diminish the patient's chances of recovery. But the mortality rate among those patients who were given large amounts of alcohol during their illness is no higher than among those given no alcohol and large amounts of fresh air. The writers' figures do not indicate that alcohol is harmful to those sick with pneumonia. They suggest that the effect of the drug varies with the conditions under which it is given, and that it is not poisonous to those who have high temperatures and are taking insufficient nourishment.

9. No change is to be expected in the results of treatment until a specific is discovered which will neutralize the toxins of the pneumococcus.

10. The results from the serum now in use are encouraging, but limited, and until its use becomes accepted, the treatment of pneumonia must be that best suited to the individual. No routine treatment has been justified by its results.

PROVISIONAL INSTRUCTIONS FOR THE TREATMENT OF CASES OF MALARIA IN THE UNITED KINGDOM.

The *Journal of the Royal Army Medical Corps* for September, 1917, states that the following rules have been issued by the military authorities:

1. Every case of malaria will be given sixty grains of quinine every week until he has been free from malarial fever for at least sixty days. This rule applies to all cases whether serving with their units, or in depots, or on furlough, or in hospital (under other diseases as well as malaria); and it is to be set aside only if there is special medical reason for doing so.

2. The sixty grains of quinine may be administered intramuscularly or orally, and in the form of sulphate, hydrochloride, or bihydrochloride, preferably the sulphate. It may be given at the rate of ten grains daily on six days in the week; or of fifteen grains daily on four days in the week; or of twenty grains daily on three days in the week; or of thirty grains daily on two days in the week, on consecutive days or not; in doses of five grains, ten grains, or more; and in solution, powder, or tablet, as convenient.

3. The administration is to be made under the direct supervision of a medical officer, who will be responsible that the dose is really taken.

4. In addition, every officer or soldier who is receiving such treatment out of hospital will have in his possession, during the two months immediately following his attack of fever, a bottle containing tablets of sulphate of quinine of five grains each, and will be instructed to take enough of these tablets to make up the weekly amount of sixty grains when for any reason, such as the individual being on leave or otherwise absent, the doses cannot be administered under the supervision of the medical officer. The officer or man will also be instructed to take one or two tablets, in addition to the usual dose, at any time of the day when he feels out of sorts or thinks that a relapse of malarial fever is about to commence; he should, however, report the circumstancs to the medical officer the following day, or earlier if the attack does not subside.

The date on which the treatment may cease (sixty days after the end of his last attack of malarial fever) must be entered on the bottle.

5. The bottle of quinine will be given by the medical officer to the officer or man concerned, whose name, rank, corps, and regimental number will be written on the bottle. The medical officer will make inquiry at medical inspections as to whether the patient has duly taken the tablets from the bottles when necessary; and, if the patient has suffered from a relapse in the meanwhile, will warn him regarding the danger of neglecting the said instructions.

The officer or soldier must bring the bottle to the medical officer when it requires refilling.

6. Cases reporting sick for attacks of fever in spite of this quinine-prophylaxis are to be treated as follows:

(*a*) If the fever is slight, the patient may be detained for one or two days, and be given thirty grains of quinine for each day on which he is detained, and another twenty grains on the day on which he returns to duty.

(*b*) If the fever is more severe, the patient should be admitted into hospital, and be given about the same dose of quinine (thirty grains), while the fever continues and for three days afterwards, and be then discharged to duty if otherwise fit.

(*c*) If the patient suffers from anemia as well as fever, or from malarial anemia only, he should be kept in hospital for longer periods, and be given sixty grains of quinine weekly, in such manner and with such additions as the medical officer may prescribe, until he is otherwise fit to return to duty.

(*d*) After discharge or transfer the patient should continue the sixty grains of quinine weekly, as ordered above, until he has been free from fever for at least sixty days.

CHILBLAINS.

The *Eclectic Medical Journal* for February, 1918, states editorially that following the inflammatory stage, if hardening results, we should use glycerin with boric acid and water to good advantage, or a hydrous wool-fat ointment of boric acid, bismuth, and camphor.

The following lotions have been comforting:

1. Hydrochloric acid, drachm j to water Oij. Soak the feet or fingers in this solution upon going to bed, or apply upon compresses.

2. Ammonium chloride, drachm ij to water Oj. Use the same as the preceding. If the tissues are hardened, add glycerin, drachm ij, and apply the solution three times a day.

3. Alum, drachm j to water Oj. Use as No. 1, especially if the tissues are very tender.

DISCUSSION ON THREE CASES OF MELENA NEONATORUM SUCCESSFULLY TREATED BY THE INJECTION OF WHOLE BLOOD SERUM.

There is to be found in the *Proceedings of the Royal Society of Medicine* for December, 1917, the following statement of clinical experience:

Mr. A. S. Blundell Bankart: I have a number of times used coagulose for bleeding during operations, and I have found it very effective. It is an amorphous powder said to be precipitated from normal horse serum and put up by Parke, Davis & Company. I have applied it locally in solution to bleeding surfaces, and sometimes the effect has been quite astonishing. Coagulose has also been used subcutaneously at the Queen's Hospital for Children in cases of melena neonatorum, hemophilia, and other persistent bleeding, and it has proved so successful that it has practically become the routine treatment there for all such cases. Such a preparation always available has obvious advantages over serum, which must be freshly prepared for injection.

Dr. Eric Pritchard: Is there any advantage in giving human serum rather than human blood? Because there must be some delay in the preparation of the serum, and there is some danger of its becoming contaminated. I have had for some time in hospital a case of purpura, with constant hemorrhages, which have been treated by a variety of methods. Coagulose has had a most striking effect in stopping the hemorrhages temporarily. I have tried injection of blood from the father, hypodermically, and this also seems to have an equally good effect, but the method is troublesome, and if the coagulose is always as effective as

the serum or the blood, it will prove a very valuable substitute.

DR. HUMPHREYS: I have tried coagulose in three cases, one of them a case of hemophilia. The boy had been bleeding for three weeks before he came into the hospital, and the coagulose stopped the bleeding in less than half an hour. The second patient, a boy with purpura, had several attacks of epistaxis, and they have all been successfully treated with coagulose. The third case, one of hemophilia, was admitted into hospital with a violent attack of hematemesis. I gave him a teaspoonful of coagulose by the mouth, and it stopped the bleeding within an hour, and he had no further attack. I have tried it locally as well, for the gums. A boy came into the casualty for severe epistaxis, with a plug soaked with adrenalin in the nostril. I removed that plug, and put in one soaked with coagulose, and in half an hour the bleeding had ceased and the boy left the hospital.

DR. HUTCHINSON (in reply): I cannot say whether these children had congenital syphilis or no; the Wassermann test was not done on any of them. But none of them presented the obvious outward appearances of congenital syphilis. As regards dosage I have given 5 to 8 Cc., but in America, I believe, they give as much as 10 Cc. and repeat it. I have not tried coagulose. As Dr. Pritchard said, it has an enormous advantage from its being always available. I wonder whether antidiphtheric serum would do as well. I agree it is a disadvantage to use human serum, because one has to wait for the blood to clot, and as these patients are extremely ill, time is of the greatest importance. I do not claim that these cases were cured by the treatment, but the mortality of melena neonatorum has been put down as at 80 per cent, and here were three consecutive cases, two of them very bad, who got well immediately after the treatment with serum, so it is reasonable to suppose there is something in it.

OBSERVATIONS AND TECHNIQUE OF LUMBAR PUNCTURE IN SEVEN HUNDRED CASES.

In the *Medical Record* of October 27, 1917, LOTT reminds us that if an imaginary straight line is drawn between the highest part of the crests of the ilia on both sides across the spinal column, through the interspace between the fourth and fifth lumbar vertebræ, this is the site of election for lumbar puncture. At this point in the cauda equina region the puncture is more easily performed and is less dangerous and painful to the patient. If the interspace between the third and fourth, and especially between the second and third, vertebræ is used, then there is danger of seriously injuring the spinal cord by either trauma or hemorrhage. If the space between the fifth lumbar and first sacral vertebræ is used, then there will usually be more pain, due to the sensory nerve roots being more easily injured, and consequently the sensation is referred to the lower extremities.

With the selected site rendered sterile (and the skin may be anesthetized), a needle is inserted through the skin where the lines bisect; after the skin is pierced and the landmarks are again ascertained, the needle is passed forward and upward at an angle of five degrees to the center of the spinal column in adults, or directly forward at right angles to the center of the spinal column in children. When the cauda equina region is reached, which is easily ascertained by the sensation of piercing the dura and entering a cavity, or sometimes by tingling in the lower extremity, then the stylet of the needle is withdrawn and the cerebrospinal fluid is allowed to escape; if some blood should escape (the cerebrospinal fluid being normally colorless), then it will be due to the fact that the needle either was passed through the cavity or has encountered the veins on the side. Then the needle should be withdrawn and passed again to the center of the cavity, and when this is reached no blood should escape unless due to the previous trauma from poor technique. When the technique is properly

carried out (and the skin anesthetized), there should be practically no pain—no more than is caused by a hypodermic injection. Such being the case, it is useless to subject the patient to the dangers of a general anesthetic, unless the patient is highly nervous and will not be kept quiet. In children who can be held, what little pain there is—and it only lasts a second or two—does not, Lott thinks, make it advisable to administer a general anesthetic. Neither does he think it advisable to use local anesthesia, except in so far as the skin is concerned; it is neither necessary nor without danger to anesthetize the deeper tissues. Pain will be produced only when the periosteum or dura is pierced. No anesthetic should be used on the dura or in the spinal cavity, for then complications are very liable to follow, particularly infection and useless trauma. Ordinarily there is practically no danger, excluding the possibility of infection, and very little or no pain except as outlined in the above procedure, the pain in the lower extremities being only transitory should it occur.

The procedure as described above is more easily performed, especially in children, and more accurately than the method frequently used, when the needle is inserted to the side of the spinal column in the interspace between the fourth and fifth vertebræ, upward and inward toward the center of the spinal cavity. Lott has found this method better only in fleshy people whose intervertebral spaces are small and the spinous processes short and very hard to palpate. Should the cerebrospinal fluid fail to escape after the stylet is withdrawn, and one is certain that the needle is in the canal, then it is due either to a blockage of the lumen by a blood-clot, or to the nerve roots obstructing the entrance, or there may be very little cerebrospinal fluid present, as may occur in purulent cerebrospinal meningitis. In such an instance one must be sure that the lumen is patent by turning over the needle and withdrawing slightly, or placing it a little deeper and then waiting a few seconds.

There are cases in which the cerebrospinal fluid is diminished; especially is this true in children, due to lack of development of the central nervous system or to higher intramedullary cord tumors. The spinal manometer may not register over 1 or 2 mm. of mercury, or there may not be over 5 drops of cerebrospinal fluid to the minute escaping. It is very hard to conceive of an entire absence of cerebrospinal fluid unless due to mechanical causes. The spinal fluid is secreted by the choroid plexus, possibly a small amount by the meningeal endothelium, and has a definite function and circulation. Lott has more than once made a "dry tap," but in these cases he has then attempted a puncture at different intervals, and finally obtained the cerebrospinal fluid. He believes the so-called "dry tap" (no fluid) is due to faulty technique, unless the cerebrospinal fluid is very flocculent and will not flow as the result of an exudate or a tumor obstructing the spinal canal, and consequently there is no circulation of fluid in the cauda equina region.

Lumbar puncture is the most valuable aid we have to-day in the diagnosis of the degree of intracranial pressure. By this method we can fairly accurately diagnose it by means of the mercurial spinal manometer much more closely than by estimating the flow of cerebrospinal fluid per minute. It is normally 5 to 8 mm. in adults or 20 to 40 drops per minute. In estimating the pressure this way the patient must be perfectly quiet, no coughing, no struggling, no crying, median line of the head on a level with the spinal column, otherwise the least exertion of the patient will cause fluctuation in the reading. There are other methods by which intracranial pressure may be ascertained, though not so accurately, such as ophthalmoscopic examination of the fundus of the eye, *x*-ray examination of the cranium, dilatation of the veins of the scalp, base of nose, and upper eyelids, diastasis of the cranial bones, exophthalmos, etc.

The value of this method is inestimable

in diagnosis of intracranial hemorrhage either from trauma or apoplexy. In the former there will be pressure, and the fluid may or may not be bloody. When blood occurs in spinal fluid the same throughout it is positive of intradural hemorrhage. If the blood is extraneous, the spinal fluid color will change while being withdrawn. In apoplexy we are able to diagnose the kind of hemorrhage, either capsular, in which there is very little or no pressure and clear fluid, or cortical and ventricular, where the cerebrospinal fluid is under pressure and may be bloody. In the latter two we are able to render surgical aid and improve conditions heretofore regarded hopeless.

Spinal puncture is equally important in recognizing early syphilitic involvement of the central nervous system, by its laboratory examination for a Wassermann, cell count, globulin reaction, colloidal gold test, etc. The so-called hopeless cases to-day, viz., general paresis, tabes dorsalis, etc., can by this aid be diagnosed very early—even before much destruction of the tissues takes place—and the disease may be checked before it is too late. Should we rely solely upon the serological examination of blood and clinical signs for the diagnosis of syphilis of the central nervous system, the disease would be well advanced; whereas we could diagnose and combat it much earlier by a careful laboratory examination of the cerebrospinal fluid, the changes in the fluid taking place much earlier than the clinical signs, which are a late manifestation.

In cases having acute intracranial pressure, much can be accomplished in a diagnostic or therapeutic way by frequently removing the fluid slowly until the pressure is normal; this is done for relief of intracranial pressure or for drainage, as in traumatic, septic, or infectious conditions of brain and cord. Frequent drainage of the cerebrospinal fluid is therapeutically indicated in selected cases in acute wet edematous conditions of the brain resulting from intracranial hemorrhage, chorea, delirium tremens, uremic coma, convulsions in epilepsy, encephalomyelitis. Very often Lott has seen a marked improvement in the above conditions within a few hours; patients coming out of coma, stuporous conditions or delirium, and convulsions, spasticity and paralysis diminishing. He has seen petit mal attacks stop for three months where previous to the puncture they occurred daily. In every case in which the patient is unconscious or paralyzed and the definite cause is not known, a lumbar puncture should be performed as an aid in differential diagnosis. More cases of fractured skulls will be diagnosed which were heretofore overlooked, and surgical aid can be rendered before it is too late.

Lott wishes to emphasize the importance of draining the cerebrospinal fluid in mild cases immediately following intradural hemorrhage when the patients are conscious, rational, and apparently in good condition. By merely draining the cerebrospinal fluid in these cases one will be able to tide the patient over the critical period and save him from surgical interference, which may be indicated later. It is very probable that a percentage of traumatic epileptics and neurotics to-day who have wet, edematous, swollen brains would have been cured or benefited had the mere relief of intracranial pressure been done by lumbar puncture during the stage of irritation and congestion immediately following the cranial injury.

There are few cases of brain tumor on record in which immediate death has followed a lumbar puncture by causing medullary compression and edema from a choked medulla in the foramen magnum. When this complication arises death may occur within a few hours. This complication is most liable to occur when the intracranial pressure is exceedingly high, or the patient is in profound shock, or there is a subtentorial tumor or hemorrhage, and the fluid is rapidly withdrawn and in large amount, which should never be done. In these cases the fluid should be withdrawn very slowly, not more than 10 drops to a minute or not at all. If at any time

during the test the patient should develop headache, nausea or vomiting, vertigo, changes in respiration or circulation, etc., while the fluid is being withdrawn, then it should be stopped immediately and the patient placed in the extreme Trendelenburg position.

Where there is very much pressure the fluid should be withdrawn slowly and the patient required to lie down twenty-four to forty-eight hours, otherwise headaches, nausea, vomiting, vertigo, and elevation of temperature may occur. This may occur because, from the high intracranial pressure of long standing, the brain is edematous and has a diminished blood supply to the choroid plexus and brain tissue; by temporarily relieving the intracranial pressure, even to a small degree, the blood supply is increased, causing overproduction of cerebrospinal fluid, and one soon finds the intracranial pressure higher than at first, hence the reaction follows; whereas, by keeping the patient in bed, head lowered, if necessary, the blood-pressure to the cranium is diminished, and a smaller amount of cerebrospinal fluid is secreted. Should reactions occur very markedly within a few hours or days after the test is made, which showed very little evidence of intracranial pressure, and the patient has been quiet in bed, it might be suggestive of intracranial pressure though all other signs were negative or practically so.

Therefore it would seem that the intensity and duration of these reactions are in direct proportion to the degree of intracranial pressure—*i.e.*, the higher the pressure the more marked the reaction.

Lott is able from the above statement to arrive at the following conclusions regarding the value and technique of lumbar puncture:

1. As an aid in diagnosis of the degree of intracranial pressure, or in the diagnosis of intracranial injury either extradural by pressure or intradural by pressure and bloody cerebrospinal fluid, no more than 5 Cc. should be removed for diagnostic purposes, which is amply sufficient.

2. As a therapeutic measure in drainage of cerebrospinal fluid to relieve pressure in selected acute cases and in infective conditions, the cerebrospinal fluid should always be removed very slowly while the patient is lying down, especially in cases of high intracranial pressure either above or below the tentorium.

3. Lumbar puncture is a safe procedure when properly performed.

4. It is therapeutically contraindicated in high intracranial pressure of long standing or in patients in profound shock.

PYORRHEA ALVEOLARIS.

GIBBS in the *Edinburgh Medical Journal* for October, 1917, publishes quite a long contribution on this well-known subject. He insists that remedial treatment to be effective must be instituted early—in the stage of early marginal gingivitis. Every microscopic piece of tartar must be removed, and the patient told that whether he keeps his teeth or not depends wholly upon his using them efficiently and avoiding soft, sticky, sweet food, that so readily ferments at the margins of the gums. Careful and proper brushing of the teeth and gums is distinctly helpful, but, as commonly used, the tooth-brush is a very questionable aid. The brush should be as small as possible, with fairly stiff bristles cut of unequal length, so as to present a saw-edge. The faces of the teeth should not be brushed across at all, as this does no good, and almost always does much harm in the long run. The rule is "Brush the gums on to the teeth" by a rotary movement of the brush on its long axis. The lower teeth are therefore brushed upwards and the upper teeth downwards, the brush being lifted clear of the gums and teeth for the return stroke or movement. In this way sticky food is swept away from between the teeth as with a tooth-pick, which is also useful. Tooth powders and all alkaline dentifrices are harmful. The best artificial aid of that sort is a saturated solution of bitartrate of potash, which is distinctly beneficial.

In the later stages much can still be done to keep the process in abeyance by affording complete drainage, *secundum artem*, to any pockets that have formed, and by periodical visits to the dentist for thorough removal of any calcareous deposits.

At all stages any functionless teeth should be removed, and, in the late stages, when the teeth are getting loose, the sooner they are removed the better, both from the standpoint of general health and because better alveolar ridges will be left for artificial teeth, which must inevitably come. All sorts of specific treatments come and go, and they need not be discussed further than to say that, in the opinion of Gibbs, neither vaccines nor the newer emetine treatment, based on the idea of an amebiasis, are of the slightest value.

REPORT ON THE TREATMENT OF FIFTY-NINE CASES OF ENTAMŒBA HISTOLYTICA INFECTION.

In the *Journal of the Royal Army Medical Corps* for September, 1917, SAVAGE reaches certain conclusions and makes the following summary of his conclusions:

1. Emetine hydrochloride injections were given to nineteen cases of *E. histolytica* infection—sixteen cyst carriers and three acute cases. Fifty per cent of the former were cured, and 33 per cent of the latter.

2. Emetine injections in conjunction with (*a*) pulv. ipecacuanha, and (*b*) half-grain emetine orally, were given to seven and four patients respectively, with very good results. Six of the former were cured, and all the latter.

3. Emetine bismuth iodide was given to thirty-three cases—seventeen cyst carriers and sixteen acute cases; 82.4 per cent of the cyst carriers were cured, and 50 per cent of the acute cases. The results in the cyst carrier cases corroborate those obtained in England.

4. Emetine one-grain injections along with emetine bismuth iodide one to two grains daily were given to (*a*) two cyst carriers, uncured by emetine bismuth iodide—one was cured, the other relapsed; (*b*) six acute cases uncured by the double iodide alone—only one was cured, and the other five relapsed; and (*c*) two acute cases not previously given emetine bismuth iodide—one was cured, the other relapsed.

5. Patients who have not previously had emetine injections appear to be cured with the double iodide, whether they are cyst carriers or acute; 88.9 per cent of such cases were cured.

6. Emetine bismuth iodide causes the infection to disappear more quickly from the stools than does emetine hydrochloride, and appears to prolong the negative period before a relapse, and, consequently, a longer period of control seems necessary.

7. Acute cases were negative on the average for twenty-one days before relapsing after treatment with emetine bismuth iodide.

8. Emetine bismuth iodide has practically no effect on intestinal protozoal infections other than *E. histolytica*.

FURTHER CLINICAL EXPERIENCE WITH CORPUS LUTEUM ORGANOTHERAPY.

In the *New York Medical Journal* of October 20, 1917, DANNREUTHER states that through the courtesy of one of the larger pharmaceutical manufacturers he was supplied early in 1916 with ampoules of the soluble aqueous extract of corpus luteum, suitable for intramusclar injection. Because of more accurate dose, more definite and complete absorption, and increased potency, it seemed reasonable to assume that such a preparation would prove still more efficient than the desiccated extract. The mode of administration affords a distinct advantage in that the possibility of chemical or other destructive digestive changes is entirely eliminated. The clear solution is composed of the water-soluble constituents and contains no appreciable amount of lipoids. The glands are trimmed carefully, and the corpora lutea dissected free of all

connective and other extraneous tissue and subjected to the dissolving action of physiological salt solution. The particular elements desired are precipitated out by appropriate chemical reagents, and then redissolved. Chloretone is added for its preserving and local anesthetic effects. The contents of each ampoule, fifteen minims, are equivalent to three grains of the desiccated extract, or eighteen grains of the moist glandular substance. The dose is smaller on account of the route of administration.

Dannreuther has used the soluble aqueous extract of corpus luteum for more than a year in approximately fifty patients, and believes that such an experience justifies the inferences drawn therefrom. This may seem to be a small and insignificant number of cases from which to make deductions, but to paraphrase Culbertson, it may be said that the majority of patients come to us with more or less genuine pathology, and the extensive exclusion of such cases leaves a surprisingly small number as material upon which to base a study. Almost all Dannreuther's investigations were made in private practice, hence the patients were subjected to more constant observation and personal control than is possible in hospital and dispensary work. Within a short time several striking facts were recognized: (1) The subjective symptoms, particularly vertigo and nausea, so often mentioned by patients ingesting the desiccated extract before establishment of toleration, are seldom noted. (2) Overdosing with the soluble extract is usually manifested by headache. (3) The desired results are more rapidly attained than after the internal administration of the ordinary extract. (4) After the influence of the aqueous extract has become apparent, the desiccated extract will maintain the improvement.

Since the subcutaneous dose of all drugs is generally about half of that given by mouth, it is readily seen that fifteen minims of the aqueous extract, representing three grains of the desiccated substance, is the proper dose. With this uniform dose its effects can be regulated by varying the intervals between injections, and this will be found more practicable than any attempt to modify the doses quantitatively.

Young women in whom absent, scanty, or delayed menstruation is the predominant symptom, in spite of negative pelvic findings, comprise a class of cases frequently encountered by the gynecologist. A clinical picture, characteristic of insufficient ovarian activity, is evident in practically all and is manifested by nervousness, weakness, pale skin, anemia, tissue tone below par, and often a tendency to obesity. Numerous other factors may enter into this symptom-complex, but these are the more pronounced. Some of these patients improve after marriage because of the circulatory and glandular stimulation produced by coitus, but even then they often remain sterile for a long time. Under corpus luteum therapy such patients as a rule immediately improve. They look better, feel stronger, become less nervous, and lose weight gradually, and a fairly regular menstrual flow is soon established.

The technique of administration is simple. An all-glass syringe of the Luer type is best adapted for making the injections, and should always be sterilized by boiling with the needle. To avoid local reactions and insure prompt and complete absorption, the injections are made intramuscularly rather than hypodermically. The most convenient site is the belly of the deltoid muscle, although other regions may be utilized if preferred. If the material is deposited deeply and the surrounding area gently massaged for a few seconds pain and subsequent tenderness seldom follow. No severe local reactions, general reactions, abscesses, nor anaphylaxis have occurred in any instance.

Control of dosage is exercised rather by shortening or prolonging the intervals between the doses than by varying the quantity given at any one time. No fixed rule can be advanced, and one's judgment must be governed to a large extent by clinical experience and careful observation. In

general it may be said that patients with pernicious vomiting of pregnancy tolerate most frequently repeated doses. Here it may be given daily without apprehension, unless some manifestation of overdosage occurs. For almost all other conditions wherein it is indicated one dose every other day usually suffices, and the intervals may be lengthened gradually as the symptoms are controlled or the blood-pressure decreases.

TETANUS PROPHYLAXIS.

The *Boston Medical and Surgical Journal* of October 18, 1917, points out that although the total number of cases of infection with the tetanus bacillus is not very large, perhaps principally because the wound incidence in civil life is spread out very thin among the communities, the disease is, nevertheless, more frequent than is commonly supposed. The form most commonly met is that of the new-born consequent on removal of the umbilical cord. But when a vast number of wounded are assembled, as in the present war, the tetanus problem becomes a very important one and one very hard to solve. The tetanus bacillus is spore-bearing, anaerobic, and very virile. It is difficult to destroy, even with high temperatures, except when the fractional method of sterilization is employed. Antiseptics seem to be of little avail against this bacillus. The spore will retain its vitality for months and even years, in the dust of old walls or cellars, especially when protected from the sunlight. The fact that the bacillus may exist in the intestines of herbivorous animals, especially the horse, may have some relation to the frequency of tetanus among soldiers wounded on the battle-field.

The successful treatment of tetanus is still very unsatisfactory, the mortality being almost absolute. However, the prophylactic treatment of all who are exposed to infection has given remarkable results. In this respect, the recognition of suspicious wounds is most important. It is best to consider every wound as suspicious that is inflicted in the habitat of the tetanus bacillus. This applies especially to wounds that are deep punctures or that are much contused and lacerated. Wounds involving such of the compact tissues as the aponeuroses and the tendons are particularly liable to infection, especially when the wounds are gangrenous. Mixed infection of a wound with pyogenic or even with saprophytic bacteria aids the development of the tetanus bacillus because by the use of oxygen by the former they make conditions in the wound even more anaerobic. The size of a wound, however, is of no import. Even very small abrasions may harbor infection. The contact of non-infected wounds with the infected wounds or dressings may cause infection; and even suspicious cases should be isolated to prevent contact.

Generous incisions of all suspicious wounds and the injection of tetanus antitoxin are the two means of preventing the development of tetanus. Where both measures cannot be carried out, the antitoxin treatment should be chosen because it is the most effective of the two measures. The limit of certain protection by prophylactic injections does not outlast a period of forty-eight hours, nor does the protective effect of the serum last longer than ten or twelve days. If the wound is not healed, then a new protective injection must be made. Injections are best made into or around the principal nerve supplying the region of the wound. It should be made between the wound and the spinal cord, in order to block the flow of toxin along the nerves from wound to nervous system. But such radical procedures as laying the nerve bare for injections are not generally countenanced. The usual prophylactic dose of tetanus antitoxin is 1500 units. In Europe, where the question of economy is a very vital one, the dose is often as low as 20 units with satisfactory results. It has been suggested that the application to the wound of absorbent cotton, previously soaked in antitoxin and then dried, would

be an efficacious means of prophylactic treatment when not feasible otherwise, the secretion from the wound liberating the antitoxin continually while in contact with the wound.

CEREBROSPINAL FEVER AND ITS TREATMENT.

The *British Medical Journal* in an editorial in the issue of September 22, 1917, says it seems hardly necessary to emphasize the point that the treatment of cerebrospinal fever is capable of much improvement by the discovery of truly specific antiserums. Additional evidence on this point is furnished by a recent report on the disease as it occurred in Australia in epidemic form during the year 1915. The report is based on a personal experience of over 450 cases of cerebrospinal fever treated in the Melbourne and Alfred Hospitals during the epidemic in the State of Victoria; in all there were 644 cases reported, with a mortality of 52 per cent. The authors give a very full account of the methods of treatment employed. They emphasize the point that the best treatment now available consists in the repeated hypodemic or intravenous or intrathecal injection of antimeningococcal serum, using relatively large doses. For intrathecal injections the dose should be about 30 Cc.; but the patient should receive about 200 Cc. of the serum daily for several days if he is seriously ill, and in all severe cases the initial dose should be 300 Cc., administered subcutaneously. Whether intrathecal injections of the serum are given or not, lumbar puncture and the removal of 50, 70, or even 100 Cc. of cerebrospinal fluid are to be performed daily.

As regards the use of anesthetics here, the authors say that in small children and very occasionally in adults who cannot be restrained, and might cause breakage of the needle, a general anesthetic may be given, and chloroform is satisfactory. But they add that general anesthetics are most undesirable here, and should not be given except for the best of reasons; some local anesthetic may be used at the site of puncture. On this point the authors are in disagreement with Major Michael Foster and Captain J. F. Gaskell, who strongly recommend the use of general anesthesia when lumbar puncture is performed.

Discussing the results of the serum treatment, Drs. Fairley and Stewart tabulate 131 cases of cerebrospinal fever treated with injections of normal horse serum, with a mortality of 50 per cent; 75 cases with antimeningococcal serum, mortality 45 per cent; and 34 cases treated by lumbar puncture only, mortality 56 per cent. Excluding cases either moribund on admission or over thirty-five years of age, the three above mortalities worked out at 47, 33, and 26 per cent respectively; only the fairly mild cases were treated by simple lumbar puncture. It is remarked that the use of antimeningococcal serum quickens the process of recovery and lessens the percentage of acute cases that become subacute or chronic.

A further improvement in the serum therapy of cerebrospinal fever consists in the intrathecal employment of antimeningococcal serum reënforced by the addition of human serum taken from convalescent cases of the disease. It is known that cerebrospinal fever is deficient in antibodies of all sorts, particularly complement; the notion underlying the employment of this reënforced serum is that the human serum added will contain complement, and thereby render the bacteriotropic action of the antiserum more effective. The improved results of this line of treatment are said to be very promising, but not yet (as it is in its infancy) statistically demonstrable. As a rule 5 Cc. of human serum were injected, together with 20 Cc. of antimeningococcal serum.

As for other methods of treatment, Drs. Fairley and Stewart recommend the daily washing out of the theca with normal saline, thrice repeated, before the antiserum is injected, in cases in which the cerebrospinal fluid has become thickly purulent and

tends to block the needle. The headache and delirium of the acute stage should be treated by lumbar puncture, and by the exhibition of 20 grains of aspirin, combined with 10 minims of liquor morphinæ hydrochloratis in half an ounce of chloroform water. All subacute and chronic cases of the disease are placed on a vaccine prepared from several stock cultures—here we seem to see the need of some differentiation of the various types of meningococci described by Captain Tuloch—administered in doses increasing from 500 million to 6000 million microbes, at intervals of four days.

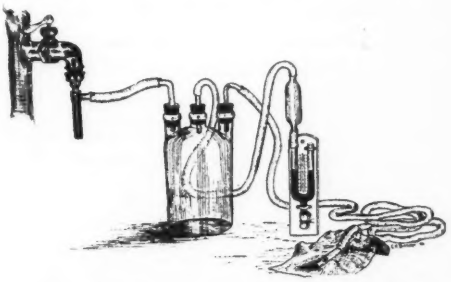
The operative treatment of the disease, apart from lumbar puncture, is considered at some length, and the authors conclude that the sudden respiratory failure and death which may occur in the acute stage of the disease are due to acute cerebral hyperemia, and not, as is commonly thought, to acute hydrocephalus, and are best treated by venesection. The onset of this respiratory failure may be anticipated if the patient becomes deeply flushed, very restless and delirious, and has intense headache not relieved by lumbar puncture.

Ventricular puncture and decompression by trephining were found to be useless in this condition; on the other hand, these operations were performed in nine subacute or chronic cases with signs of internal hydrocephalus. All terminated fatally, but in several instances the patient's life was prolonged. It is noted that three out of nineteen cases of internal hydrocephalus recovered spontaneously.

In the final chapter of the report the use of urotropin and helmitol as cerebrospinal antiseptics is considered in detail. In the absence of adequate supplies of antimeningococcal serum in the early days of the epidemic urotropin was thus used extensively. The authors conclude that both clinically and experimentally it is useless as a cerebrospinal antiseptic. It can liberate formaldehyde only in an acid medium, and cerebrospinal fluid is always alkaline; urotropin itself is not an antiseptic agent. The report on helmitol is more favorable. Helmitol, or hexamethylene tetramine anhydromethylene citrate, liberates formaldehyde in alkaline as well as in acid media; *in vitro* it does inhibit the growth of the meningococcus. But it has not proved possible to discover formaldehyde in the cerebrospinal fluid even after massive intravenous injections of the drug, perhaps in consequence of lack of delicacy of the chemical tests employed for its recognition.

EMPYEMA—SIMPLE, INTERRUPTED AND CONTINUOUS ASPIRATION.

In the *Archives of Pediatrics* for September, 1917, RICHTER writes first of ordinary paracentesis thoracis. He points out that the needle must not be placed too low lest the diaphragm in rising interfere with its action. The mere insertion of a fairly large bore needle without the tube will permit of the escape of pus, but permit also the entrance of air. It seems to Richter that the latter fact is undesirable. The injection of formalin or other bactericidal substance also seems to him undesirable.



Apparatus used for continuous aspiration of the pleura in empyema. The rubber dam effects a tight joint between drainage tube and chest wall. The amount of mercury in the tube determines the degree of tension obtained before air passes over and tends to equalize the pressure.

Where infection is not controlled and an increasing degree of intoxication obviously calls for more adequate treatment, drainage of the pleura becomes necessary; but drainage has commonly resulted in a high mortality in young children, partly due to the virulence of the mixed infection which ensues, but quite as much due to the serious loss of proteid that accompanies the loss of so much pus. It is essential in draining

the pleura that we obliterate the pleural cavity as quickly as possible by the simple expedient of drawing the lung up to the chest wall. The best means of accomplishing this purpose is one of the modifications of Perthes' method of continuous aspiration. The accompanying sketch, taken from the author's article published in *Surgery, Gynecology and Obstetrics*, March, 1906 (which see for detail), illustrates a method used by Dr. Van Hook and Richter for upward of fifteen years with very satisfactory results. By its means one can maintain a continuous suction or negative tension in the pleural space until complete expansion of the lung occurs. By maintaining the lung fully inflated complete obliteration of the pleural space will quickly ensue. Adhesions between the visceral and parietal pleura will form quite as rapidly as between peritoneal surfaces under similar conditions. In this way the large suppurating pleural cavity can be reduced to but a small granulating surface in a few days, and the great flow of fluid from the broad surfaces involved immediately reduced.

This method differs essentially from the Bülau technique and its various modifications. Bülau inserted a good-sized trocar and attached a rubber tube, allowing the weight of the column of fluid to maintain a continuous aspiration, to be continued until suppuration ceased. But living tissues will not permit of continuous pressure of a trocar. Necrosis very quickly develops and the tube becomes loose, and a larger one must be inserted to maintain an air-tight joint. With the method here described the joint is made relatively air-tight by using a flap of rubber tissue, with vaselin or similar material between it and the skin. Continuous suction is then maintained with a pump, which will take care of any air-leakage that may occur.

Acute suppurative pleurisies of mixed infection and those having their origin in gangrenous or tuberculous cavities are far more serious than the type above described, but they are also much less often found in children. Old neglected cases and cases in older children that have been drained for a long time often offer complications that cannot be met by the simple methods here described.

SPECIFIC SERUM THERAPY OF EPIDEMIC POLIOMYELITIS.

In the *Journal of the American Medical Association* of October 13, 1917, NUZUM and WILLY report their use of antipoliomyelitic horse serum in the treatment of 159 cases of poliomyelitis. They state that in by far the majority of patients receiving serum, the fever, at times high, has fallen rapidly to normal within periods varying from twelve to twenty-four hours. Coincident with this critical drop of the temperature there usually occurs a slowing of the pulse-rate and other clinical evidence of rapid general improvement.

Finally, Nuzum and Willy consider briefly the extremely important problem of the dosage and mode of administration of the serum. A careful analysis of the case histories suffices to demonstrate the harmlessness of the serum when slowly injected both intraspinally and intravenously. The serum has always been tested for sterility after passage through a Berkefeld filter, and has been used without a preservative. It must be free from corpuscles and hemoglobin.

As in other acute infectious diseases, a recovery from poliomyelitis must depend on the process of self-immunization. Accordingly, the simultaneous intraspinal and intravenous injections of immune serum afford the most rapid way of flooding the central nervous system with specific antibodies to neutralize the virus of the disease. The writers have attempted to treat all cases as early as possible with relatively large doses of serum. Obviously the amount of serum that can be safely given to a child intraspinally is small. Accordingly they have regularly injected small doses of from 5 to 10 Cc. of serum very slowly by the gravity method after the previous withdrawal of an equal or greater amount of spinal fluid.

At the same time intravenous doses of from 10 to 30 Cc. of serum are given according to the age of the patient. In many patients they have repeated the intravenous injections at twelve- to twenty-four-hour intervals, using the temperature as a guide to dosage, with beneficial results. The majority of patients have received total amounts of serum varying from 40 to 75 Cc., depending on the age and severity of the case. In a few critical cases they have injected a total amount of 150 Cc. within seventy-two hours, with beneficial results.

1. Of 159 patients received in all stages of the disease, nineteen died, a mortality of 11.9 per cent. Among 100 cases occurring during the same period of time, in which the patients did not receive serum, thirty-eight patients died, a mortality of 38 per cent.

2. Nuzum and Willy have treated 152 patients in all stages of infantile paralysis, excluding seven cases presenting respiratory paralysis on admission, with eleven deaths—a mortality of 7.2 per cent. During this same period of time a total of 301 cases was reported to the Health Department with ninety-seven deaths—a mortality of 32 per cent.

3. This series of treated cases suffices to demonstrate the harmlessness of serum treatment when the serum is free from hemoglobin, sterile to repeated cultures, and the injections are slowly made and all known rules of precaution are observed.

4. The serum seems to possess the power of definitely preventing the onset of paralysis when administered early in the disease. In ten undoubted instances of poliomyelitis in which no paralysis was detected at the time the serum was administered, prevention of paralysis and complete recovery resulted in 100 per cent.

5. The action of the serum is more definite in arresting the extension of paralysis and diminishing the severity than in effecting its disappearance.

6. As in other acute infectious diseases, the earlier the serum is administered, the more striking are the results obtained.

7. Serum should be injected intraspinally in small doses and at the same time intravenously in larger amounts. The temperature has been employed as a guide to the dosage.

8. The injection of serum is followed by a critical fall in the patient's temperature. Coincident with this there occurs a slowing of the pulse-rate, and usually other definite clinical evidence of general improvement.

9. In doubtful early cases the decision to use serum should rest on the bacteriologic, chemical, and microscopic examination of the cerebrospinal fluid.

A RAPID TEST FOR OCCULT BLOOD.

The *Medical Record* of October 20, 1917, asserts, wisely, that all gastrointestinal cases, as well as cancer suspects, should have stool examinations. The examination for occult blood, for example, although probably not familiar offhand to the average practitioner, may be very useful in detecting early carcinoma, ulcer, or intestinal parasites. Barker states that as much as 5 per cent of occult blood may be present without being recognized by the naked eye.

The first thing we think of is the guaiac test, but Vaughan calls attention to the advantages of the benzidin test, which is generally considered too delicate for clinical use. He uses Wagner's "dry test," which consists in adding a few drops of mixture of a knife-point of powdered benzidin (an amount the size of a match head), 2 Cc. of glacial acetic acid, and 20 drops of a 3-per-cent solution of hydrogen peroxide to a little solid feces on a clean glass slide; a greenish-blue fading color is positive. The material for a slight variation of this test may now be obtained in very convenient form for the practicing physician.

After exhaustive experience with this test, Dr. Vaughan concludes that it is the most reliable, as well as the most simple, rapid, and clean. It is not, he thinks, too delicate for clinical use. A negative result is more reliable evidence of the absence of blood than a negative guaiac test. Meat

fibers, pus, and the usual drugs and food do not vitiate this test, and rare meat does so only if it has been taken in considerable quantity.

THE TREATMENT OF PULMONARY HEMORRHAGE.

MARTIN in the *New York Medical Journal* of October 20, 1917, discusses this topic.

Of the special methods in use, artificial pneumothorax is extensively employed. If the hemorrhage is profuse, or other recognized methods of treatment have failed, recourse should be had to it without delay. One of its principal limitations is the occasional difficulty in determining from which lung the bleeding arises. Hemorrhages severe enough to warrant its use are usually seen only in tuberculosis cases sufficiently far advanced to have a bilateral involvement. As it has been frequently found post mortem that the origin of the bleeding was from the side least involved, the relative extent of the lesion in the two lungs cannot always be relied upon as indicating the side to be injected. Furthermore, the blood, in the severe cases especially, frequently enters the bronchi of the opposite side, producing physical signs extremely deceptive. Consequently it is not infrequent that mistakes are made, sometimes with unfortunate results. Artificial pneumothorax is usually resorted to only in cases deemed quite desperate; therefore, slight doubt should in no way prevent its employment if not otherwise indicated. Many times it will prove unavailing, perhaps the most frequent cause being the impossibility of collapsing that portion of the lung from which the hemorrhage arises, the obstacle being firm pleuritic adhesions. For hemorrhage cases, a fairly high degree of interpleural pressure should be produced.

Strapping the chest, either unilaterally by adhesive strips extending from the sternum to the spine or on both sides of a broad encircling band, has often been employed. Those advocating this procedure believe that by restricting the respiratory movement clot formation is hastened. While of questionable value, it is a harmless procedure provided the straps can be applied without unduly disturbing the patient. This can be more easily done when a single broad strap is applied to the chest as a whole, rather than to the affected side alone. For the purpose of diminishing the amount of blood in the lungs, ligation of the extremities may be resorted to if the hemorrhage is severe. A soft pad can be placed over the large nerve trunks to prevent their injury by the compression. The constricting bands should be removed after an hour or two, although occasionally they may be left on longer. If too long retained, paralysis of the limbs may occur. They should be removed one at a time with some degree of caution to prevent a return of the hemorrhage.

The local application of cold over the supposed site of the hemorrhage is a common practice. The ice-bag possesses greater advantages for this purpose. It is lighter than the lead coil, requires less attention, and allows a closer application to the chest wall in emaciated patients with sunken interspaces. To quiet an overacting heart, if present, another is applied directly over the precordium.

In cases associated with high blood-pressure, pulmonary edema, cyanosis, and coma some authorities advocate venesection, "believing that it is safer to bleed from the arm than from the lungs," as they express it. Although it is a procedure which would be usually undertaken with reluctance, its supporters assert that, when indicated, marked benefit has followed its employment. Hypodermoclysis and saline intravenous infusions have a less field of usefulness in the pulmonary forms of hemorrhage than in most others. The latter procedure especially should be resorted to only when there are indications that death is imminent from rapid exsanguination, at which time active stimulation, the application of heat, and other measures in the treatment of collapse should be applied to prolong the heart's action until clots form at the site of hemorrhage.

THE MANAGEMENT OF DECUBITIS.

BROWNING in the *Medical Record* of October 13, 1917, says that the usual routine of simply adjusting a pad of oakum or a dressing of any convenient antiseptic finds in practice little to commend it. The most thus accomplished is a partial absorption of accumulating filth.

What is needed is an application that penetrates, disinfects, deodorizes, checks secretion, and, if possible, has some constructing quality. Bichloride of mercury does not penetrate. Carbolic acid and its kind may sear the surface, but hardly get farther, and in these conditions are specially liable to induce carbolic gangrene.

There is one agent, however, that can favorably affect the tissues, and accomplish all these desirable effects. That is formalin (formaldehyde), as shown by its application in histology, but used of course in proper dilution. The peculiar qualities of this agent and their adaptability to the purposes in question need no discussion. A half-per-cent solution of the usual 40-per-cent standard strength serves these ends admirably, and with care causes no undesirable irritation.

A convenient way to meet the various indications each time is to cleanse the ulcer and all its ramifications with plain boiled water as warm as can be handled. Then finish with the formaldehyde dilution, getting it well into each crypt and sinus. This includes automatically the stimulating effect of alternating temperatures.

To avoid the exsiccating action of the solution on the user's hands it might doubtless be applied by means of swabs or under protection of rubber gloves. With Browning the custom is to make the application with a syringe; this method has the advantage of facilitating its introduction into all pockets and covered tracts and its contact with the exposed surfaces.

Finally it is necessary to have a dressing material that in the intervals of cleansing keeps up the action as far as practicable. For this purpose the subiodide (oxyiodide) of bismuth has been found very satisfactory. It is dusted on in sufficient quantity to make a protective absorbent and antiseptic layer everywhere over the area.

This whole dressing must be repeated as often as requisite for cleanliness, at the start several times in the twenty-four hours, and thereafter twice or thrice a day is a minimum. When the raw surface becomes dry and clean crusts form, they may be left undisturbed to facilitate cicatrization.

CAMPHOR IN CARDIOVASCULAR DISEASES.

The *Lancet* of September 22, 1917, says that therapeutic observations by Professor MARFORI, of the University of Naples, with regard to the action of camphor on the cardiovascular system, have brought to light certain properties which deserve attention. Hitherto this drug has been looked upon as the last resource to prolong the life of a diseased and exhausted heart, and injections of camphorated oil have been almost exclusively reserved for counteracting cardiac collapse in acute infective disorders or the threatened paralysis of the last stages of heart disease.

Professor Marfori and his assistant, Dr. G. Leone, found that the isolated mammalian heart, when poisoned by chloral so as to render the pulsations barely perceptible, could be rapidly restored to action by camphor, and furthermore, that its action on the circulation was very characteristic, as it could be proved that small doses invariably caused a diminution of arterial pressure and at the same time increased the volume of the cardiac pulsations. Only toxic doses of camphor give rise to increased arterial pressure, accompanied by convulsive phenomena which seem to be independent of the vasomotor centers, as they are observed even during profound narcosis when these centers are rendered inexcitable. Hence, during the course of chronic myocarditis with cardiac insufficiency, with changes in rhythm and auricular fibrillation, Professor Marfori considers

no other drug can compete with camphor in sustaining the activity of the heart and steadying the pulse. He noticed that the beneficial effects obtained were continued after the drug was suspended, but recommends systematic treatment for a long period by giving one or two daily hypodermic injections of 0.10 gramme in oily solution. These doses may also be given by mouth, as they are well borne. In valvular lesions, when disturbance of the pulmonary circulation and hypertension in the right ventricle predominate, camphor is the most rational and efficacious remedy. The drug is also quite useful in the pulmonary sclerosis of tuberculosis and in arterial hypertension with hypertrophied heart, vascular spasm of climacteric origin, and arteriosclerosis. It is capable of inducing beneficial changes in disordered function of the myocardium and especially of the right ventricle.

In conclusion, Professor Marfori says that camphor must no longer be considered merely as a remedy in the hour of death, but rather as a drug which, when intelligently administered, is capable of producing beneficial results throughout the entire course of various cardiac and vascular diseases owing to its special properties, which are distinct from those of other heart drugs.

VACCINATION AND TETANUS.

The *Boston Medical and Surgical Journal* of December 6, 1917, states that the elements of society opposed to vaccination against smallpox, besides opposing this procedure on the ground that it is inefficacious to prevent the development of this disease, oppose it on the ground that it is the means of introducing disease into the body, particularly syphilis and tetanus. The claim of inefficacy can easily be disposed of by calling attention to the fact that since the introduction of this means of prevention smallpox has almost entirely disappeared from civilized communities. The question of the introduction of syphilis has no force at present, because human vaccine virus is no longer used, and, so far as is known, syphilis is transmitted only from man to man and the higher apes. But when we come to the consideration of tetanus, it must be admitted that unless this factor can be disproved it is a serious arraignment of vaccination.

With this point in view, an exhaustive study of vaccination tetanus was made by Anderson (Hygienic Laboratory Reprint No. 289). In the first place, it was found that during a period of about ten years and the sale of over 40 million vaccine tubes, not more than 41 cases of tetanus had been reported. Even if the vaccine origin of these cases were authenticated, the percentage of infection would be almost infinitesimal. Examination of vaccines from the same stock that apparently caused infection failed to reveal the presence of any tetanus bacilli. Moreover, it was found on investigation that there were no other cases of infection with tetanus, although the same lot of vaccine had been used. In the same period, in over half a million vaccinations in the army, under strict supervision, not one case of tetanus developed. Experiments were undertaken to infect susceptible animals—monkeys and guinea-pigs—with vaccinia and with tetanus at the same time, but while the vaccination "took," it was impossible to infect them with tetanus. This seems to prove that even in infected vaccine heavily laden with tetanus, there was little likelihood of the development of tetanus.

An intensive study of the data surrounding the 41 cases of tetanus revealed some interesting features. The average incubation period, reckoning from the time of vaccination, was 22 days and the mortality was 70 per cent. And yet it is known that in tetanus from other causes, where the incubation is less than ten days, the mortality is only about 61 per cent—a very high mortality at best. In cases in which the incubation period was more than ten days, Anders and Morgan report the mortality as not over 41 per cent. It would seem,

then, that if the period of incubation in vaccine tetanus was 22 days, a mortality of over 70 per cent was inordinately high, or else that the incubation period of this post-vaccine tetanus was in fact less than 22 days—perhaps even less than 10 days. In other words, infection did not have origin 22 days preceding the development of tetanus, that is, at the time of vaccination, and vaccination cannot justly be credited with the guilt for the development of this disease. It is more logical to suppose that this post-vaccination tetanus occurred as any other post-surgical tetanus—from the introduction of tetanus bacilli through careless surgical methods with regard to the care of the vaccination wound. Indeed, in some of the cases investigated this was clearly proved. The removal of scabs, the presence of dirty vaccination shields, and careless handling can all infect a vaccination wound. The removal of the crust or scab from the vaccination can allow infection with tetanus germs or spores, and the reformation of the scab can produce the anaerobic conditions necessary for the development of tetanus bacilli. The question of the prevention of tetanus infection or other infection with relation to vaccination depends upon the strict enforcement of surgical cleanliness at all stages of the vaccinia. The absence of any case in the army, where such discipline can be enforced, points to the direction in which more care must be exercised where large numbers are vaccinated.

RECENT ADDITIONS TO OUR KNOWLEDGE OF POLIOMYELITIS.

In *Northwest Medicine* for December, 1917, RICH states that perhaps the most important recent addition to our knowledge of poliomyelitis was given to us this year by Lovett and pertains to the various degrees of recovery from the acute disease as influenced by the form of treatment pursued. Rich believes Lovett's study of 2000 cases in New York furnishes us with an epoch-making advance, and his conclusions should be common knowledge to every man treating poliomyelitis. His conclusions positively verify the German view of ten or more years ago, when they began to immobilize the cases at the end of the acute stage and during the entire long subacute stage in plaster beds and even in body and limb casts to render muscular motion impossible.

To strip Lovett's paper of some interesting figures that are not in the possession of Rich, let Rich bring to us Lovett's conclusion.

Of all the paralyses encountered in 2000 cases, the greatest clearing up of the paralyses occurred in the *right* hand and arm. Next same the *left* arm.

Of all the paralyses appearing in 2000 cases, those that showed the greatest tendency to persist or recover slowly were in the *right* leg. Next came the *left* leg.

The palsies of the trunk, while occupying an intermediate position, showed a tendency for greater recovery the higher up they were. In other words, the cervical muscles supporting only the head recovered with greater frequency than the lumbar muscles with the bigger load and mightier functions.

To interpret these findings it is necessary to understand that the regulation treatment in New York consists in absolute rest in bed during the acute stage, passive motion in the subacute stage until two or three months have elapsed, or until patient is sufficiently recovered to stand alone, and then encourage active exercises.

It is the supposition that inflammation of and pressure upon the nerve cells in both horns of the cord are responsible for permanent or temporary palsies in the terminals that the cells supply. When a paralysis in a muscle gradually recovers, changes in the cord must necessarily precede it, and these changes constitute relief of the inflammation and pressure, and also the repair of damaged nerve cells.

Lovett rationally concludes that if a nerve cell is *compelled to functionate* and impart nerve impulses during the period of

repair, after the inflammatory stage of poliomyelitis, the natural consequence is that the repair is permanently impeded and recovery is never complete. He believes that an injured nerve cell should be at absolute functional rest during the long, long period of repair.

Weight-bearing upon the legs during the year-long (and sometimes two-year-long) subacute stage is responsible, he claims, for the permanency of the leg palsies. The arm recoveries are accounted for by the freedom from weight-bearing and the establishment of light force, free exercises. Most persons being right-handed accounts for greater light exercise in the right arm and greater permanent recovery. In other words, the heavier the work thrown upon a regenerating nerve the poorer its chance of recovery.

Lovett, therefore, advocates a general treatment of the victim of poliomyelitis in somewhat the fashion accorded that of the right hand and arm. The long-continued rest, a fairly early institution of passive motion and muscle massage, and finally late active exercises of the arm and legs without weight-bearing and without strain.

ALCOHOLISM: SOME COMPLICATIONS AND THEIR TREATMENT.

In the *Pennsylvania Medical Journal* for November, 1917, DOANE, of the Philadelphia General Hospital, reaches the following conclusions:

1. The cure of chronic alcoholism presents an almost hopeless task, particularly in city hospital practice.

2. Every municipality of the first class should have a city farm for inebriates, to which patients could be committed for not less than one year; and where authority for retention of these patients could be enforced. Special provision should be made for medical care prior to commitment.

3. In delirium tremens a well-defined period of incubation exists, and during this period well-planned treatment is most effectual. Preventive treatment shows by far best results.

4. Once hallucinosis is developed, massive doses of sedatives do not appear to be indicated.

5. Morphine and chloral, in Doane's opinion, are seldom, if ever, useful, and usually decidedly harmful.

6. The acidosis theory of delirium tremens seems proven. This is either due to starvation, or to a lessening of the phosphates and carbonates which are used up in neutralizing the gradually increasing acid elements in the body fluid.

7. Alkaline perfusion has not yielded very encouraging results in Doane's hands. It is indicated only in cases in which other less heroic measures have failed. It does not shorten hospital stay. There is danger in overloading an already diseased circulatory system, as is usually met in chronic alcoholism, or any of its complications.

8. Magnesium sulphate injections offer slightly better chances for saving life and shortening the hospital stay, but the alarming action on the sensory and reflex functions of the nervous system point to the danger in its use. This method also probably has a place as an emergency measure.

9. Alcohol is indicated in treatment of the first stage, but rarely shows any results once the second stage is developed. Routine spinal drainage is advisable.

10. The prognosis in all second-stage cases is grave, and the mortality runs from 25 to 35 per cent.

STERILIZATION AND CLOSURE OF SUPPURATING FRACTURES.

GUILLOT and WOIMANT (*Surgery, Gynecology and Obstetrics*, November, 1917) consider in this article the treatment of cases of fracture which continue suppurating for a long time. They note that a great many fractures of the long bones remain fistulous; that probably 50 per cent of fractures of the thigh still suppurate after ten months' treatment. As a result of their study they observe that fractures in full process of suppuration can be sterilized and closed. The technique comprises the following procedures: (*a*) preliminary dis-

infection, (*b*) operative treatment, (*c*) sterilization, and (*d*) closing of the focus of fracture.

In nearly all instances the patients had received surgical treatment a few hours after injury in a hospital near the front. At first sight this treatment appears either complete or incomplete. In some cases we are confronted with a widely exposed fracture; in others with a badly cleansed cavity which communicates with the exterior only by means of one or more inadequate openings. In the latter case one is tempted to perform an immediate operation, and this procedure has often been followed in the base hospitals. But this should be absolutely prohibited, for an operation conducted under these conditions is followed by a marked rise in temperature, and sometimes by septicemia and death.

Before an operation is attempted, infection must be reduced as much as possible. This is accomplished by intermittent flushing with Dakin's solution. If it is impossible to introduce tubes into the focus careful incisions may be resorted to, but the bones should not be handled. These incisions do not expose the patient to the grave complications which ordinarily follow osseous operations performed in an infected focus. This preliminary disinfection must be done in all cases, whether the previous operation has been well or badly conducted. An exception may be made in the case of very old fistulous fractures which show no inflammatory reaction.

The first process must be carried out by an exact observance of the principles of Carrel's method and of the details of its application. The progress of disinfection should be followed by the bacteriological curve, for it is imperative that one should be able to visualize at a glance the modifications in the number of bacteria. Every other day, after the flushing has been suspended for two hours, films are made of secretions from the wound taken from such parts as are apparently most highly infected. The bacteria of three microscopic fields are counted on this preparation, and the average result of the observations is registered on the curve. The curves thus obtained are different from the sterilization curves of fresh fractures. The latter, at the outset, show no or very few bacteria in films of their secretions, and the bacteria appear in large quantities only after twenty-four or thirty-six hours. They increase in number for some time, after which a rapid and regular diminution occurs.

It must be assumed at the outset that the appearance of a plateau in the bacteriological disinfection curve is an indication of the presence in the wound of infected foreign bodies. These may be necrotic fragments of tendon, aponeurosis or bone, projectiles, particles of clothing, etc. Of whatever nature, it is imperative that the foreign body should be removed.

When surgical treatment is applied to flat bones or epiphyses of long bones, it presents no particular difficulty. With the help of a gouge-forceps or a fraise all the compact or spongy tissue affected with osteitis is carefully abraded. It is necessary, as far as possible, to avoid opening the joints which are capable of movement, without losing sight of the fact that any part which is well exposed and thoroughly flushed will never become dangerously infected.

The surgical treatment of old fractures of the long bones, on the other hand, presents real technical difficulties. It does not suffice to remove the sequestra, or to abrade the necrotic surfaces, or even to curette all the foci of osteitis. This form of surgery, which has been practiced on thousands of cases since the beginning of the war, has usually resulted in failures. As a rule, when this method has been used, infection sets in rapidly in the bone-marrow and in the clots of blood remaining in the wound. Osteomyelitis and lamellar necrosis of the walls of the medullary canal are the ordinary consequences of this kind of surgery, while opening of intraosseous abscesses produces fresh fistulæ.

In order to avoid these complications, it is necessary to perform a systematic operation involving the successive consideration

of the following factors: incision, periosteal callus, sequestra, splinters, and bone ends.

In preparing the patient, tincture of iodine should not be employed. Dakin's solution, which is necessary for the further sterilization of the wound, generally produces burns on an iodized surface.

The incision need not necessarily extend beyond the fistula or the wound of the first operation. Exposure of each diaphysis is made according to definite rules, by which a maximum portion of the bone may be exposed with a minimum of risk to the adjacent organs. The operation should be conducted plane by plane, by successively detaching and utilizing each in such a manner that the hemostasis may be facilitated and the wound as a whole may contract from the surface inward. If the line followed is that of a fistula or of an infected wound, it is preferable to excise all the infected and sclerous tissues, and the process of elimination or sterilization will thereby be reduced. But it is important to keep account of the quantity of tissue disposed of, and care must be taken that sufficient skin is kept for future closing. The consideration of this fact has often prevented the authors' excising the edges of the mouth of a fistula.

The best method of penetrating the periosteal callus, after the surrounding osteogenic membrane has been turned back, is effected by careful manipulation of the rugine. With the help of roentgenograms, this uncovering must be confined to that part of the callus which is to be excised. Through the opening thus made, a gouge-forceps is introduced, which extends the infected cavity of the periosteal callus in the direction of the bone ends which are to be explored. The extremities of the fragments must be exposed. In order to reach the end of the callus, it will suffice to scoop out with a curette every part affected with osteitis.

If the fracture is recent, or if the periosteum has suffered extensive destruction, there is no callus. In such cases the fracture cavity can be immediately penetrated, and the bone ends are consequently more easily accessible.

A careful investigation should be made for sequestra which may have been projected into the medullary canals at the time of injury. Their presence constitutes one of the causes for the absence of the medullary plug observed in the course of the consolidation of fractures.

If the splinters are necrotic, all fragments which are not indispensable to consolidation must be removed.

These are sometimes exposed at the site of fracture, and sometimes obliterated by an osseous plug. The sealing of the fragments by the medulla must be considered as a normal stage in the evolution of open fractures. This process is impeded in various ways. Sometimes the projection of a fragment of bone, which rapidly becomes necrosed, may be the cause; in other cases the plug, after formation, has been destroyed by osteitis. But in the majority of cases the defect of obturation is explained by an intense infection, which has from the outset produced necrosis of the contents of the medullary canal and of its walls. In such cases the bone ends are laid bare and are seen to be exposed and bathed in the pus proceeding from the site of fracture.

All severe accidents that follow upon operation in the focus of infected fractures are invariably connected with the opening of the medullary canal. The operation sets free the bacteria and provides them with contused tissues and clots of blood favorable to their cultivation, with the result that if in their vicinity there is an inadequately drained canal filled with an easily infectible marrow, the immediate result will be the occurrence of severe septic accidents.

The authors have regularly observed the following phenomena: (*a*) A fracture in which the bone ends are obturated causes no postoperative reaction. (*b*) A fracture in which the bone ends are not occluded produces an intense reaction, if the cavity of the medullary canal is not plentifully flushed by the antiseptic solution. (*c*) A fracture in which the non-occluded bone-

ends have been widely opened by surgical intervention will produce no reaction.

From the above facts they have drawn the following conclusions for the treatment of bone ends: (1) The surface of the medullary plugs should be explored with a curette, in order to ascertain that there is no communication with the subjacent medullary canal and that no sequestrum is enclosed. (2) The medullary canals which have remained open should be hollowed out with a pince-gouge in such form as to produce a wedge-shaped cavity, communicating freely with the flushing tubes.

In infected fractures of the long bones, the wide opening of the non-obturated medullary canal is a factor of importance. But this detail in itself does not suffice to prevent every form of reaction. It is usually observed that the temperature reaches its maximum in the evening of the second day after the operation. Thus there is an interval of more than twenty-four hours during which the multiplication of bacteria at the surface of the new wound should be prevented as much as possible.

It was found that in the first days of sterilization the most infected parts were always the blood-clots situated in the vicinity of the severed bones or of the medullary cavities. Therefore it was attempted to prevent the formation of the clots. With this object in view, after having clamped and ligated all the bleeding vessels with the utmost care, they arrested all oozing of blood from the bones and medulla, by means of prolonged flushing with physiological salt solution at 40° C. Sometimes more than a quarter of an hour was needed to obtain this result, but there is no doubt that this perfecting of the technique has shortened the time employed in the process of sterilization.

In a similar manner the process of disinfection during the first two days was accelerated by flushing out the wound every half-hour during the day and every hour during the night, after which the usual flushing every two hours was resumed.

When flushing is repeated at close intervals, it is important to use hypochlorite prepared electrolytically, as this substance exerts only slight irritation on the skin.

The combination of these three processes, the wide opening of the medullary canals, careful hemostasis, and frequent flushing with electrolytic hypochlorite, has enabled them practically to suppress all postoperative febrile reactions.

This method of procedure has also greatly affected the course of the bacteriological curve. After their first operation on old fractures the number of bacteria increased *ad infinitum* during the next few days. It will be seen by means of charts that this bacterial increase has now become almost negligible. At all events, after a varying length of time, the number of bacteria falls below three per field. When this stage is reached, it is advisable to let several days elapse before closing the wound.

In fresh fractures, once sterilization is assured, the closing of the cavity is effected without any special difficulty. After resection of the edge of the epidermis, the edges of the wound are dissected. Profuse bleeding is avoided as much as possible. Horsehair sutures are used. If pressure is applied to the dressing, while at the same time the bone ends and adherent splinters are brought together, the cavity produced by the fracture will be completely obliterated.

The same procedure is also successful in old fractures if the periosteal callus is not in process of formation, or if the condition of the muscles makes it easy to force them back into the cavity.

In other cases the focus of fracture cannot be closed without the aid of a filling, for otherwise a cavity would be left beneath the sutures, in which the secretions of the wounds would accumulate. Various kinds of filling were experimented with.

Beck's paste is superior to that of Mosetig, for it is easier to apply and involves no danger of intoxication. It necessitates the interposition of a musculoaponeurotic plane between the paste and the cutaneous sutures. In the case of old fractres it is hard to effect this interposition. The chloramine

paste has the advantage that it can be applied directly beneath cutaneous sutures. But it falls away if, as frequently occurs in the case of old fractures, the sutures pull and gap slightly, owing to the lack of tissue. The best filling seems to be an adipose graft; but this procedure must be limited to cases in which the formation of the periosteal callus is well advanced and where there is no danger of psuedoarthrosis. With this one limitation, this method is found suitable in the majority of cases, since it does not require the making of a musculoaponeurotic layer; the graft is always obtainable in the vicinity of the zone of operation; and it will keep in place even in cases in which, owing to the lack of a sufficient quantity of cutaneous tissue, the wound has remained partially open.

CONSTRUCTIVE SUGGESTIONS TOWARD THE CONTROL OF SYPHILIS, GONORRHEA, PNEUMONIA, TYPHOID AND TYPHUS FEVER.

WILE (*American Journal of Syphilis,* October, 1917) states that while the ethical and moral sides of the venereal problem are the main issues to be met from the standpoint of public health, an earnest endeavor must be made to counteract the existing epidemic of syphilis and gonorrhea. Large as are the figures of reported cases, they underestimate the total number of cases and are particularly lacking in accuracy for gonorrhea. A programme for the prophylactic control of these diseases must be constructed on the basis of the recognition of syphilis and gonorrhea as diseases of more serious consequence to the community than practically any other disease with the possible exception of tuberculosis. From the health view-point the mode of attack must not involve the stigmatization of the sufferers as moral outcasts or degenerates.

Prevention necessarily involves the cure of the victim, who otherwise is a constant menace to the community as a focus of infection. Our hospitals and dispensaries treating these diseases have failed to justify themselves by their results. The percentage of their established cures is disgracefully small, being in the large majority of institutions under fifteen per cent. This seems a low-grade efficiency which would scarcely be tolerated in any other field of human endeavor. To counteract these negative tendencies, dispensaries should be obliged to have a standardized equipment suitable to meet the needs of treatment. Hospital facilities should be available for incipient cases, without the necessity of segregation in special hospitals and without penalizing those infected because of the nature of the method of infection. From the standpoint of communal usefulness hospitals can perform no greater service than by curing luetics and gonorrheics during the stage of greatest curability. It is reasonable to demand such service from all institutions receiving public moneys for caring for public charges. The community should be able to dictate the types of cases requiring hospitalization. If this can be done during a poliomyelitis epidemic, it certainly is within its jurisdiction for a syphilis endemic.

SIDE EFFECTS OF THE TREATMENT OF SYPHILIS.

HARRISON (*Quarterly Journal of Medicine,* July, 1917) in a review of the treatment of syphilis details the symptoms which may be displayed after the injection of "606" and "914," apart from the therapeutic effects of these remedies. In roughly chronological order they are as follows:

Occurring during or immediately after the injection: Vasomotor disturbances, also known as anaphylactoid symptoms, or minor nitritoid crises; syncope; pain in the gums and teeth; peculiar taste in the mouth.

Following the injection usually by a few hours, and occurring generally on the same day: Rigor, rise of temperature, headache; vomiting, diarrhea, pain in the back, and cramp in the legs; urticaria, herpes (labialis and zoster).

At various times from a day or two to a

month or longer after a single injection or a course of such: Albuminuria; stomatitis; chronic headache, lassitude, loss of appetite, weight and sleep; erythema and dermatitis; jaundice; severe cerebral symptoms.

To consider the above rather formidable list in detail:

The vasomotor symptoms, which have also been designated by different authors as anaphylactoid or as nitritoid crises, vary somewhat in degree and occur only after intravenous injections. They are commoner after injections of "606" than "914," and the usual symptom is puffing of the face, dilatation of the pupils, rapid pulse, feeling of constriction about the throat and mouth, and perhaps some precordial distress with coughing. In the more severe degree the face becomes intensely congested, the lips and tongue may swell considerably, the precordial and respiratory distress is great, and there may be some convulsive twitching of the limbs. If the symptoms commence after the patient has left the table and before he has got to bed, he may lose consciousness, or this may occur on the table. Sometimes, immediately after an attack, the body is covered with urticaria. Usually all symptoms have passed off in about half an hour, but exceptionally they may persist for several hours. As to their frequency, it is difficult to form an estimate, since some patients are particularly susceptible, being affected with every dose they receive, and one such case increases the percentage incidence in a hospital considerably. Again, there is no doubt that different batches of the remedy vary in their power of promoting these vasomotor effects, and the use of a disturbing batch for some time increases the incidence in that clinic. On an average, one would judge the proportion all the year round to be rather less than 1 per cent of injections.

Milian divides the signs of intolerance into mild and grave, thus: Mild signs are indicated by an odor or a taste of garlic, etc.; hypersecretion of certain glands, especially the lacrimal; increased intestinal secretion, causing diarrhea; possibly increased secretions of the choroid plexus, causing severe headache; vasomotor symptoms or nitritoid crises, such as congestion of the face, swelling of the lips, as described above, during the injection; slowing of the pulse, when this is not due to the injections being given too rapidly; prolongation of rigor, fever, and vomiting, especially the latter, into the next day, or undue intensity of these; repetition of the immediate reaction after the second or third injections in a form as severe as happened after the first; prolongation of the reaction so that the patient remains in bed longer than usual, suffering from great malaise, feeling of fatigue, and tendency to vomiting and diarrhea on slight provocation, with insomnia for two or three nights after the injection; rise of temperature on the third or fourth day after the injection; buzzing in the ears; pruritus, often with punctate erythema or urticaria; pains in the joints, especially in the back; and persistent congestion of the face and eyes, with subicterus coming on after the second or third day.

The grave signs are persistent vomiting, scarlatiniform erythema, jaundice, and the graver forms of vasomotor disturbance, "crises nitritoides secondaires."

The susceptibility may be increased artificially. It has generally been found that patients who have fasted for some hours prior to the injection, and have taken a laxative the night before, have suffered much less from reaction than those who neglected these precautions. Milian believes that the preceding diet should be arranged so as to render the blood strong in basic substance in order that the injected remedy may not disturb the reaction of the blood. For this reason he recommends restriction of meat, acid, salads, and fruit, and the giving of milk and vegetables. Westrope claimed that by putting the patient on a milk diet for twenty-four hours previously he had very considerably reduced the number and severity of reactions.

It is generally considered, too, that exertion or the taking of food soon after injection increases the susceptibility to the

remedy. The clinical evidence on this point is not very convincing.

Alcoholics are generally more susceptible, if one may judge from the case-records of deaths. Probably this is due to the toxic effect being exercised on blood-vessels which are already diseased, especially the kidney vessels.

It is generally accepted that the administration of an antisyphilitic remedy, whether mercurial or arsenical, to a person suffering from syphilis may result in a transitory exacerbation of all symptoms. The phenomenon is known as the Jarisch-Herxheimer reaction, and can easily be observed in syphilitic skin and mucous membrane lesions on the day of the first injection of "606" or "914," or on that following it. It is a fairly common event to see increased redness and swelling round a primary sore on the following day, as remarked very early by Queyrat and Boutier. Intensification of the rash and shortly afterward increase in the strength of the Wassermann reaction are other manifestations of this reaction.

From clinical observation and animal experiments it is obvious that different batches of "606" vary in their toxicity, particularly in regard to their power of producing vasomotor symptoms. One may divide batches into two categories from this point of view:

Category A: Safe, even with a technique which is less than good in its attention to detail.

Category B: Safe, if dissolved in water from a good still, alkalinized carefully, and strained or filtered before injection, but very liable to cause vasomotor disturbance if these precautions are not observed.

In view of the fact that it is impossible to detect an abnormal idiosyncrasy in an otherwise normal patient, the initial dose should be such as can be borne without danger by the most susceptible and the subsequent dosage increased only very gradually. In this respect almost all workers agree that, in the absence of any particular contraindication, 0.3 grm. of "606" is a safe initial dose for practically every man, 0.2 grm. for women, and 0.05 grm. for infants.

The intervals between injections should have regard to the well-recognized cumulative effect of these arsenical preparations, and it is unsafe to rely entirely on the excretion of arsenic by the urine as a guide to the length of the interval. Generally speaking, however, in the absence of signs of intolerance four-day intervals between doses of 0.4 grm. and 0.5 grm., and a pause of two to three days after the administration of each total of 0.9 grm., are safe. A careful watch should be maintained on the urine for defective diuresis, albuminuria, and casts. Loss of weight, chronic malaise, erythemata, and the signs of intolerance indicated by Milian are valuable indications for reduction of subsequent doses and for increase of intervals beyond the ordinary.

For vasomotor disturbances the intramuscular injection of adrenalin as recommended by Milian is generally effective. The dose originally recommended was 1 to 1½ Cc. of a 1-in-1000 solution, but smaller amounts have often proved effectual.

Ordinary reactions require no further treatment than rest, but for high fever and severe headache most workers recommend aspirin or pyramidon in the usual doses.

In a case of generalized erythema, with high fever and intense headache, the writer once removed 18 ounces of blood by venesection, with immediate relief to the headache, and the fever and erythema had completely disappeared by the following morning. Another similar case, in which severe symptoms were aborted by venesection, was subsequently reported to the writer by Capt. Rawlinson, R.A.M.C. In a third case, intense headache and pruritus were relieved at once by venesection to 10 ounces, but the erythema was not aborted. For erythema one would recommend, in addition to phlebotomy, the free use of saline purges and the taking of large quantities of bland liquids.

The treatment of exfoliate dermatitis is troublesome, and there is little guidance from the literature. Calamine lotion and powder, bran baths, and starch poultices are very soothing, while 10-per-cent ich-

thyol ointment appears to be successful in places where there is much pustulation, but no application has been found to work "like a charm." Dieting is important, and meat and eggs seem often to provoke relapses. Paraffin and salines are good aperients, and preferable to mercurial preparations. The patient's body should be carefully protected against chill, especially in cold weather.

For the treatment of epileptiform convulsions most workers recommend phlebotomy followed by saline infusion, and lumbar puncture. Milian and those who have witnessed its good effects in minor cerebral disturbances would in these cases also employ adrenalin.

In early generalized syphilis the disease affects the meninges almost as frequently as the skin and mucous membranes. The same condition is found in "neuro-recurrences."

The incidence of neuro-recurrences is inversely proportional to the amount of treatment which the patients have received.

Prompt treatment with one of the newer arsenical preparations generally results in disappearance of the neuro-recurrence.

The treatment of neuro-recurrences which is almost unanimously advocated is the prompt administration of "606" or "914" and mercury, and the happiest and most permanent results are obtained when the arsenical preparation is pushed to an extent far beyond what is usual in ordinary routine work. The writer has not hesitated to administer totals of eight or more grammes of "606" to such cases and has seen nothing but good results from this practice. This appears to be a complete answer to the contention of those who hold that the newer arsenical preparations have a neurotropic action. It would be well if those who have to report on neuro-recurrences in the future were to state the exact amount of treatment which the patient had previously received. Without this information a false impression, which is unjust to the arsenical preparations, may easily be conveyed.

The absolute contraindications have become considerably reduced with experience as to the safety of small doses, controlled by careful observation of their side effects, and at present one would exclude only cases of Addison's disease, bleeders, and those suffering from such advanced visceral disease that death must inevitably follow in a short time.

There is a fairly general agreement as to the diseases the presence of which is an indication for caution as to dosage, etc. These are visceral lesions, such as myocarditis, renal and hepatic disease, arteriosclerosis, aneurism, diabetes, and advanced disease of the central nervous system. Pregnancy, though hardly a disease, also requires caution.

Visceral diseases may be syphilitic or otherwise. In those which are syphilitic there is the fear that the exhibition of a large single dose at first may cause such a severe Jarisch-Herxheimer reaction that the organ is fatally damaged. In this connection may be mentioned syphilitic disease of the central nervous system, where it is possible that a process affecting the vital centers, either directly or through their arterial supply, may temporarily become so aggravated as to lead to the death of the affected center.

Attention does not appear to have been drawn to the care which should be exercised where the patient is constitutionally liable to dermatoses, such as eczema, erythema, and urticaria. In these it is reasonable to suppose that the skin vessels are in an abnormal state and likely to be still further damaged by the arsenical preparation, unless this is administered with due regard to its cumulative effect.

Neisser would commence with a dose of 0.1 grm., rising gradually and leaving intervals of ten days between doses when these have reached 0.4 to 0.6 grm. Kromayer was probably the first to recommend frequent small doses, giving 0.1 to 0.2 grm. three times a week to a total of 3.6 grms. Leredde, who is a believer in pushing the remedy in the later stages, insists on a small initial dose (0.1 grm. "914" followed by 0.3 grm. in eight days). Gennerich

commences his cases generally with a dose of 0.15 grm. "606," while Emery, as also Fordyce, usually commences with 0.3 grm. for men who are quite well.

These examples will serve to show the general recognition of the necessity for caution which now prevails with regard to initial dosage. Similarly, recognizing the cumulative effect of these remedies, the former practice of administering large doses at short intervals has ceased, and the general custom now is to allow an interval of seven to ten days after the dose has reached 0.4 grm. "606," or its equivalent in "914."

Although the consensus of opinion is in favor of a cautious commencement in all cases, it is equally unanimous as to the necessity for administering a sufficiently large quantity to insure immunity from recurrence, and in condemnation of the practice, which still unfortunately prevails in some quarters, of giving only one or two doses.

Opinions are divided as to whether "914" is equal therapeutically to "606." Most will agree that in immediate effect it is difficult to choose between them, but it is also difficult to overlook the opinion of such authorities as Gennerich and Dreyfus, amongst others, who hold as the result of later observation that "914" is not so powerful or permanent in its therapeutic effect.

Probably this has to do with the more rapid excretion of "914" after intravenous injections, as has been shown above, since Wechselmann and Eicke have stated their opinion, with which the writer concurs, that when administered subcutaneously, so that it is excreted more slowly, "914" gives better results than follow the intravenous injection of "606."

As to the toxicity, it seems probable that, as pointed out by Schreiber in the first place, under a good technique "914" has the advantage. It must be remembered, however, that "914" is a much more labile preparation, and that errors in technique, such as impurities in the solvent when it is given dilute and delay in administering it, are visited with more certainty by serious after consequences.

TREATMENT OF TOXEMIA AND COMMON INFECTIONS IN CHILDREN BY INTRAVENOUS INJECTION OF EUSOL.

SMITH, RITCHIE and RETTIE (*Edinburgh Medical Journal*, September, 1917) state that they have been able to show that the solution known as eusol, in which free hypochlorous acid is balanced against calcium biborate, can be applied without difficulty in the treatment of septic wounds, and, in particular, that no toxic or irritating effects resulted when it was freely applied to extensive raw surfaces or cavities. The application of eusol to the treatment of toxemia by intravenous injection formed part of their inquiry. For intravenous injection they recommend the use of standard eusol, 1 Cc. of which is equivalent to 1 Cc. 1/10 normal sodium arsenite solution. They show that by experiments in rabbits a considerable quantity of eusol can be safely injected into the blood stream.

In applying this method it is essential to note that a simple aqueous solution of hypochlorous acid cannot be injected into the blood because of its acidity, due to spontaneous decomposition. It is practically impossible to prepare at normal temperature a solution of hypochlorous acid which does not contain free chloric acid. The biborate of calcium which is present in eusol neutralizes the strong acid but leaves the weak hypochlorous acid free; the solution reacts alkaline to litmus.

A first trial of the method was with a case of puerperal septicemia which was regarded as hopeless. The patient recovered.

Soon after this Captains Fraser and Bates applied the method to the treatment of toxemia from gas gangrene, which apparently showed that remarkable benefit followed the injection of eusol in moderate doses of 40 to 70 Cc.

The general conclusion from these cases

is that at a certain stage of the generalizing from an infected wound or other local focus of what is ordinarily denominated sepsis the introduction of eusol into the blood is beneficial to the patient and the progress of the sepsis becomes arrested. On the other hand, in cases in which the condition has reached a stage which is properly described as pyemia, in which multiple foci are being or have been established, or in those in which a severe or long-continued toxemia has lowered the resistance of the patient, the benefit which follows the injection of eusol may be insufficient to arrest the septic process.

The authors experienced this difficulty in the treatment of two cases of ulcerative endocarditis; in a case of puerperal pyemia with multiple foci in spleen, kidney, and brain; and in a case of osteomyelitis. In each instance there was benefit from the injection of eusol, but this was not maintained, and the sepsis was not arrested.

The authors conclude as follows: The cases treated form a series representative of the common infections met with in the Children's Hospital. These include infections with the ordinary pyemic organisms, the meningococcus, the tubercle bacillus, and the virus of rheumatism. No beneficial effect was produced in cases of tuberculosis or rheumatism, so that further observations are necessary in respect of these conditions.

Beneficial effect was produced in infections with the ordinary pyogenic cocci, and this was usually observed immediately after the injection. In a few cases in which the nature of the infection was not determined, as in the case of toxic diarrhea, a similar result was obtained.

When eusol is cautiously administered no untoward effects follow. In one case of the series symptoms of cardiac disturbance were observed, and in this the record notes that the eusol was injected too rapidly.

The results recorded go to prove that in certain cases the toxic symptoms of common infections yield to this treatment no less than those following the more definite toxemias of wound infection and gas gangrene.

An appendix is given on the method of intravenous injection, with the preparation of the drug.

ANTITOXIN FOR GASEOUS GANGRENE.

BULL (*New York Medical Journal,* Nov. 3, 1917) holds that the local destruction of tissues and the lethal effects of Bacillus welchii infections are due to a specific bacterial toxin. His work shows that under suitable cultural conditions Bacillus welchii produces a soluble toxin which, after separation from the bacilli, is capable of causing the essential lesions of gaseous gangrene and possesses the physical and biological properties of an exotoxin. By immunizing animals with the bacteria-free toxin an immune serum has been obtained which has the power of neutralizing the toxin both *in vitro* and *in vivo,* as well as preventing and controlling infections with the bacilli. It is indicated, therefore, that Bacillus welchii should be classed with Bacillus diphtheriæ and Bacillus tetani as a toxin-producing organism, and that infections with this organism can also be successfully prevented and controlled by neutralizing its toxin with a specific immune serum.

The fact that one and the same toxin is common to all strains of the gas bacillus (Bacillus welchii) group greatly simplifies the problem of specific therapy, since it will not be necessary to produce a polyvalent antitoxin, or to determine the peculiarities of the infecting strain in each case before treatment can be rationally applied. If the different members of the group were as individualistic with regard to toxin production as they are with regard to other antigenic factors, *e.g.,* agglutinogens, both specific prevention and therapy would be impossible. Considering the widely different sources of the strains already studied, it seemed reasonable to conclude that one toxin is common to all strains of the group.

The results obtained with the preventive and therapeutic applications are very encouraging. They derive significance, in the first place, from the fact that gas bacillus infections in guinea-pigs and other susceptible animals are comparable with infections with this organism in man. The experimental infections in the guinea-pig differ, however, from the natural infections in man, since man possesses a higher natural resistance to infection with this organism, and such massive infections do not occur in nature. The protected guinea-pigs manifested perfect immunity to hundreds of lethal doses of the bacilli several days after the antitoxin had been administered. It seems reasonable, therefore, to predict that the infection in man will not develop as long as his body fluids and tissues contain an adequate quantity of the antitoxin.

The possibilities of passive prophylaxis have natural limits of time, depending upon the rapidity of elimination of the foreign serum. The experimental data presented in this paper and practical experience with antidiphtheritic and antitetanic antitoxins indicate that, in all probability, a passive immunity to Bacillus welchii infection of at least two weeks' duration can be conferred upon man. An immunity of ten days' duration from the time of exposure to infection will be sufficient in the great majority of instances, since only sporadic cases of Bacillus welchii infection arise after this time, the greatest number occurring forty-eight hours after exposure. In the light of the results obtained in treating the infection in guinea-pigs, it is reasonable to hope that the antitoxin will be of value also as a therapeutic agent. The indications are that early infections can be readily arrested and the more advanced and severe ones ameliorated, if not wholly checked, so that surgical interference may be resorted to with greater possibilities of effectiveness. It can be stated here, parenthetically, that the antitoxin is being prepared on a large scale in horses, and that very potent serums have been obtained; that a few cases of gaseous gangrene in man have already been treated, in which the efficacy of the antitoxin was unmistakable. The antitoxin was administered intravenously and locally about the wound.

Twenty-nine strains of the Bacillus welchii group have been found to produce toxins which are qualitatively indistinguishable.

It has been possible to confer on guinea-pigs a passive immunity of about two weeks' duration to Bacillus welchii toxin through a protective administration of the antitoxin.

Guinea-pigs which had received a prophylactic dose of Bacillus welchii antitoxin exhibited pronounced resistance to infection with the virulent bacilli for a period of twelve days.

PROPHYLAXIS IN VENEREAL DISEASES.

Under this heading the *Lancet* of October 13, 1917, in a leading article calls attention to a recent discussion of the Congress of Venereal Diseases of the question of artificial prophylaxis and quotes the resolution to be submitted to this body, which runs as follows:

"In view of the public attention now directed to the whole subject of prophylaxis, the Executive Committee, after careful consideration, is not prepared to depart from its original position, in which, in accordance with the spirit of the Royal Commission's report, it refrained from recommending the adoption of prophylaxis—*i.e.*, the provision of outfits to men before sexual indulgence. The committee strongly urges the importance of the making of arrangements for the early treatment of venereal diseases even before the onset of symptoms."

The *Lancet* believes that the preventive in venereal diseases among the troops should start earlier than it does now. The Canadian, Australian, and especially the New Zealand troops have suffered greatly from venereal disease, and, with regard to the last, the *Lancet* has been supplied with figures which almost justify the phrase em-

ployed in the communication to the effect that "London is the plague spot of the world." There can be no doubt that the feeling among numerous officers of the Colonial troops is that the facilitation of artificial prophylaxis is necessary for the safety of their men, while many are convinced that the control of loose women would greatly increase the fighting strength, and would annul the risk that the soldiers may carry back to their homes hereditary disease as well as the glory of having fought for their country.

To these feelings every consideration is due; and, if the views expressed can be supported statistically, the country at large will hold that the National Council for Combating Venereal Diseases have a responsibility put upon them by the war that was not upon them when they were created to carry out the valuable conclusions of the Royal Commission.

We are in the face of military facts: all men are wanted, and venereal disease prevents a certain proportion of them from responding to the call. Measures might quite sensibly be taken now which would have no justification in normal times; nor would a change of attitude at such a juncture mean a permanent return to discredited social tactics. We are at this moment reconciled, with a unanimity that would have been quite inconceivable three years ago, to the distribution of bombs by aeroplanes upon German cities. Does anybody believe that the spirit thus indicated is likely to remain a permanent national spirit of the country? In the same way, we do not for a moment suppose that, if it should be found wise to-day to control the action of certain women in certain military areas, or to recognize the existence of illicit coitus by instituting a system of supply to sailors and soldiers of prophylactic apparatus, we should be committed in the future to the lower state of public morals indicated by such methods. These are some of the more important points which the National Council for Combating Venereal Diseases will have before them at their meeting, and they will be debated frankly and no restraint will be put upon the expression of opinion by the allegation that to depart from a line of conduct hitherto followed is either to do ill with the illogical hope that good may come, or to display a cowardly inconsistency. It requires knowledge to decide what an ill deed really is, and it requires courage to deal with facts which contravene an accepted course of procedure.

THE CONTROL OF VENEREAL DISEASES.

Abbott (*Lancet*, Oct. 20, 1917) believes that in the near future intravenous injections of salvarsan will be the recognized method of combating syphilis. The patient is to be fasted three to six hours previous to the intravenous injection; this avoids vomiting. They should have been purged on the previous day; this usually renders them somewhat depressed and miserable. They should be instructed to avoid drinking much fluid during the twelve hours immediately preceding the injection and to abstain altogether from taking liquids for the last six hours. Thus the tissues have lost a good deal of moisture, are physiologically "thirsty," and simply "mop up" the arsenic from the blood stream after it is injected, much to the detriment of the health of the Spirochæta pallida, the microörganism which causes syphilis.

Fixation of the skin, the essential feature of which is that it immobilizes the subcutaneous vein, is one of the most necessary factors of success. If this be not done the thrust of the needle as it traverses the skin will most probably displace the vein laterally and longitudinally—*i.e.*, it will produce a kink in it. The skin is fixed by pressure exerted on its surface. It is convenient to use for this purpose the second and ring fingers, slightly separated, of the left hand; but any digit will serve, the thumb in certain positions being extremely useful. The pressure should be exerted at a spot about three inches nearer to the hand than the site of the puncture; this leaves sufficient room in

which to work. In fixing the skin, do not drag the vein toward either side, but just pull the skin slightly down toward the hand, exactly in the same direction as the course of the vein. The integument is thus put gently on the stretch, but enough force must not be used to obliterate the lumen of the vein. Now press the skin upon the subcutaneous tissues sufficiently firmly to counteract the thrust of the needle.

In private practice the fact that our patient can be sent away immediately after the operation is completed very much simplifies the matter. Let the patient therefore sit on a chair placed alongside a narrow table about 3 feet wide and of a convenient height. He is thus sitting sidewise close to the table, over which a couple of sterilized towels are placed, and upon these the patient lays his arm. It will be seen that, by reversing the position of the chair, either arm can be used for the injection. There should be ample light coming toward the surgeon. To insure this the table is placed near a window, and the chair will be along that side which is nearer the source of illumination. Make the patient lean well back in his chair and a flood of light will stream along the arm, showing up, like thick cords, the prominent distended veins.

The arm having been bared, a length of rubber tubing of 18 inches is applied above the elbow as a tourniquet, a piece of lint first being placed round the arm to take the immediate pressure of the tubing. Put the rubber on the stretch as it is used and make it tight enough to constrict the veins, but not to obliterate the radial pulse. Commence by placing the middle of the tourniquet behind the upper arm. Bring the two ends to the front, looping one end under the other to keep the tourniquet in position. The loop is easier to undo than a knot, simply requiring to be pulled. Now instruct the patient to tightly clench his fist. If in doing this there is a tendency to flex the forearm, put a roller bandage under the back of the wrist, and press the fist down over this so as to keep the arm straight.

When passing a needle into the interior of a vein one can often see the course of the vessel better by looking somewhat horizontally along the arm rather than vertically over the top. In this way the course of the veins appears very like the metals of a railroad when looking along its track. The position the operator assumes is somewhat like that which a billiard player adopts when making a "shot."

The best method of holding the needle is to grasp its shoulder between the thumb and first finger of the right hand, if an ordinary instrument, say a Weintraud or a Record, be employed. A much more sensitive touch can be obtained by this method than by holding the instrument in any other way.

The bevel of the needle used for intravenous injection should not be as long as that of a needle ordinarily used for serum work, because it is necessary that the whole of the bevel be in the vein. If, however, the bevel be very long, there is the possibility of its being partly within and partly without the blood stream. Another point to note is that the bevel ought not to be ground straight, but it should be concave, because this shaped edge more easily picks up the vein wall.

The best vein to select for the injection is the radial, and at a point some three inches below its junction with the median cephalic. Here the radial vein lies over a convexity, so that the operator is not working in a hollow, which is frequently the case, especially in fat arms, when one of the veins at the bend of the elbow is selected. Further, the radial is one of the most immobile veins in the arm. It is also straight and fairly long. In selecting a vein it is not wise to choose one of the largest, because a clot sometimes forms after the injection, and it is as well not to risk a clot in one of the main channels. Again, if a vein of medium size is chosen, we still have the larger ones to fall back upon if we fail successfully to pass the needle into the first vein. Before passing the instrument make quite certain, by rolling the selected vessel between the finger and the subcutaneous tissue, that there is not a thrombus from a

previous injection. If there should be one, then select another vein. Clean the needle well before using it, or you may leave a black puncture mark, caused by oxide of iron, which is irremovable.

The skin having been fixed, hold the needle very nearly flat—*i.e.*, very nearly parallel with the plane of the skin, and likewise in the direction of the vein and immediately over its "crown," by which, of course, is meant the center or highest point of its track. With one movement pass the needle, bevel upward, through the whole thickness of the skin and proceed onward subcutaneously for half an inch.

It has been stated by some authorities that the "eye" or bevel of the needle should be downward—*i.e.*, toward the vein; but it will be found that the needle is much more easily passed through the skin, and it picks up the outer wall of the vessel much more readily, when its bevel is turned upward away from the vein. Indeed, the bevel of the needle is very like the edge of a carpenter's plane, and should be directed similarly toward any object it is intended to cut. The point of the needle is now in the subcutaneous tissue between the skin above and the vein below and lies immediately over the vein. At this stage it is very important to define the position of that portion of the needle which is under the skin. Without knowing this the inexperienced operator is very liable blindly to plunge about in the subcutaneous tissues, often traversing the vessel, and in any case failing to get the bevel of the instrument into the venous blood stream. In order to determine the position of that portion of the needle lying subcutaneously, the needle is lifted up bodily away from the deeper structures toward the surface of the skin and the shoulder depressed slightly. This movement reveals the exact situation of the whole of that portion of the needle under the skin, because, in bodily lifting the instrument up, the skin has been stretched tightly over it, and its position thus accurately marked.

We now look for the vein and note its course with the eye or feel it with the left hand. If by any chance the point of the needle be not lying over the center of the vein, we should alter subcutaneously the position of the instrument so that the point does occupy this situation relative to the vein. The skin is refixed if the hold has been released in order to search for the vein. We then simply depress the point of the needle sufficiently to engage the wall of the vessel, but not enough to traverse it, and push gently and steadily along the course of the vessel; the needle must pick up the vein, and as we proceed we will feel a sudden "give" in the resistance, a sudden relaxing of the tissues as the needle enters the vessel, and on looking at the end blood will be seen to be flowing. Sometimes a distinct "click" is heard as the needle pierces the vessel wall. It often takes, however, an appreciable time, something like two or three seconds, for the pressure in the vein to force the blood backward through the narrow lumen of the needle and flow out at the other end. Therefore, we should not be in too great a hurry to decide that the bevel of the needle is not within the interior of the vessel.

Another phenomenon which will be noticed is the formation of a dimple in the skin, a little distance behind the point of the needle. This occurs at the instant when the needle first impinges upon the vessel wall, and the mechanism of its production is as follows: When the needle, as it is gently pushed onward, first reaches the vein, it does not immediately pierce it, because the actual tip of the needle is really the apex of a triangle, the sides of which are formed by the bevel. Now these sides, diverging from the apex, offer a certain amount of resistance to the passage through the coats of the vein. Thus the first result of the impact of the needle against the vessel wall is to push it onward. The vein is, however, connected to the skin by the subcutaneous tissue, and as the vessel is pushed in front of the needle it drags the skin after it. Finally, however, the needle pierces the coats of the vein, the vessel slips

back, the tension between itself and the skin is released, and the dimple disappears. The formation of this dimple is a good "rallying point" in the operation of intravenous medication. It does not always occur, especially if one is using a fine needle with a very sharp point, or if the instrument is thrust into the vein by "stabbing" at it. There is then very little pushing of the vessel in front of the instrument.

It is often found that after the application of the tourniquet to an arm practically devoid of fat the veins present immediately beneath the integument—*i.e.*, there is no pad of subcutaneous tissue between the vessel and the skin. In such patients the operator will find that as soon as he has passed the bevel of the needle fairly through the whole thickness of the skin the instrument is already within the venous blood stream, the skin and the closely applied vessel having been punctured practically at one and the same time.

As soon as the blood is definitely and continuously flowing from the end of the needle the tourniquet can be removed and the instrument connected with the apparatus which the practitioner is using for the injection of the drug.

The one certain indication that the bevel of the needle is within the lumen of the vein is blood issuing from the end of the instrument. If there be no blood escaping from the base of the needle, then its bevel is not within the lumen of the vein, unless of course the instrument be not patent. This loss of patency occasionally occurs through a tiny mass of subcutaneous tissue intimately mixed with blood-clot plugging the vessel, which condition is sometimes brought about by repeated unsuccessful attempts to pass the needle into the vein. If this sequence of events has happened the surgeon will often notice that although blood be not issuing from the base of the needle, yet it is leaking a little along the track of the instrument, and appearing at the site of the skin puncture; there is thus a great probability of the bevel of a blocked needle having been passed into the venous blood stream. It is better in such a case to try venipuncture at another spot. Do not withdraw the first needle until the second has been successfully passed, because when left *in situ*, the needle acts as a plug for the previous puncture in the vessel wall.

RECTAL CRISES OF NON-TABETIC ORIGIN.

MacLennan (*Glasgow Medical Journal*, September, 1917) describes attacks of pain by no means uncommon, but the description of which has rarely appeared in medical literature. Both sexes are liable to the attacks. It has been observed in ages ranging from sixteen to fifty. The pain is deep seated and the crisis may come on after defecation, especially after straining, or may wake the victim from a sound sleep. Tenesmus is present, and the act of defecation, though at first it causes an exacerbation of the suffering, results in its cessation. In men there may be priapism. The pains may be so severe as to cause syncope. The pain is usually of comparatively short duration, minutes or hours, and may be accompanied by a general tremor or rigor, followed by cold.

Examination of the rectum during the attack has demonstrated in two cases the presence of a fine fibrillar tremor in the internal sphincter. Piles may be present, and undoubtedly enter into the etiology. A severe type of rectal crisis was recently observed after colostomy in a case of inoperable cancer of the rectum.

The lesion is certainly a neurosis, though it affects persons not of a neurotic temperament and otherwise in sound health. In no case examined during the pain has the rectum been found quite empty, and constipation of a minor degree has been the rule.

The treatment found most efficacious has been the inhalation of a dozen drops of chloroform placed on a handkerchief. Morphine is too slow. Hot rectal douches are rapidly effective, although not instantly available. Crises of pain are not of frequent occurrence.

A STUDY OF THE RECTOSIGMOID.

W. J. Mayo (*Surgery, Gynecology and Obstetrics,* December, 1917) observes that with the exception of the pyloric end of the stomach and the first portion of the duodenum, the rectosigmoid is more commonly diseased than any portion of the gastro-intestinal tract.

The rectum proper begins at the middle of the third sacral vertebra and, anatomically speaking, ends at the level of the apex of the prostate in the male and at the upper level of the pineal body in the female, sites which mark the beginning of the so-called second portion of the rectum, or more correctly, the anal canal.

The anal canal of Symington has its origin in the proctodeum or skin infold. It is lined with pavement epithelium, has no mucous glands, and is in no way a part of the rectum, but is rather a retentive mechanism extraordinarily well adapted to temporary rectal retention. The anal canal is about 3 centimeters in length, and passes upward and forward at such an angle in relation to the musculature of the rectum as to relieve the strain on the sphincter muscles. This valve type of mechanism is exhibited in the compression of the ureter in the wall of the bladder and of the common duct in the wall of the duodenum. Its most important artificial imitation is shown in the brilliant work of Coffey, which has made transplantation of the ureters to the large intestine an operation of safety and precision.

The rectum is, therefore, a single organ averaging 11 centimeters in length, with a protective sigmoid mechanism above and the sphincter apparatus of the anal canal below. The upper of the two left valves of Houston, which is nearly always discernible although sometimes rudimentary, lies just below the inferior margin of the terminal sigmoid constriction. The lower left valve of Houston lies below the level of the peritoneum, while the single large right valve, which is nearly always present, projects well across the lumen of the rectum near the mid-point.

The ampulla of the rectum may be described as the sacculated portion lying between the anal canal and the lower left valve of Houston. The middle portion of the rectum ends above at the right valve, while the upper rectum extends to the sigmoid at the upper left valve. The index-finger of the average examining hand, when the anal canal is forcibly elevated, can reach to, and often a little above, the right valve of Houston, but not to the rectosigmoid juncture.

This interpretation of the anatomy of the rectum is in harmony with its embryologic origin. The rectum proper is derived from the cloaca, a highly differentiated part of the hind gut, from which also the bladder is derived. Definite anatomic changes are to be found in the epithelial layers of the mucous membrane at the rectosigmoid juncture and possibly a tissue weakness worthy of note.

The terminal two inches of the sigmoid has considerable resemblance to the lower rectum just above the anal canal. The more or less circular folds of the mucous membrane of the sigmoid here take on a longitudinal arrangement with much the appearance of the columns of Morgagni and the rectal sinuses, and end in a rudimentary sphincter apparatus at the very beginning of the rectum. This hint of a sigmoid sphincter at the rectosigmoid union forms a well-marked resisting constriction to the readily dilatable sigmoid above and the rectum below.

Examination shows that this circular band at the termination of the sigmoid contains considerable non-striated muscle fiber. Clinically, there is often seen through the proctoscope, when the patient strains during examination, a tendency of the movable sigmoid to project through this muscle band as a slight intussusception into the fixed rectum. Tumors in the terminal sigmoid are not infrequently intussuscepted into the rectum, giving the diagnostician on digital examination the erroneous impression that they are rectal.

Examination of the rectosigmoid—that is,

the part of the rectum which lies above the right valve of Houston and the terminal two inches of the sigmoid from the inside—shows not only those definite changes in color and arrangement of the mucous membrane which characterize the rectum and sigmoid respectively, but also in a high percentage of subjects the rudiments of the terminal sigmoid sphincter which defines the two organs. Examination of the outside of the rectosigmoid discloses prominent features of identification: The rectum has no mesentery; the longitudinal muscle bands of the sigmoid spread out, making a complete longitudinal layer for the rectum; the superior rectal artery divides into the right and left branches at the origin of the rectum; and the absence of epiploic tags, which are found on the sigmoid to its end.

The impression is gained that ordinarily the rectosigmoid is an arrangement for retention of contents in the sigmoid proper, and that under certain circumstances the controlling mechanism may subject the parts to undue stress.

The rectosigmoid apparatus is controlled by the pelvic plexus of nerves, which is made up of a variable number of sympathetic ganglia joined from above by spinal nerves from the lumbar region and from below by spinal nerves from the sacral region. From the lower part of the pelvic plexus nerves can be traced into the rectosigmoid region and the rectum. The inferior mesenteric plexus, containing a variable number of sympathetic ganglia, follows along the course of the superior hemorrhoidal artery and helps to supply the rectosigmoid and the upper part of the rectum. According to Langley and others, the nerves derived through the hypogastric plexus are inhibitory in action, while those from the spinal and sacral nerves are motor.

In addition to the nerves mentioned, the smooth muscle fibers which compose the musculature of the rectosigmoid, like all non-striated muscle fibers, have the power of originating contraction, and, according to Keith, these impulses are collected. Failure of coördination results in a most curious and interesting pathologic phenomenon: the so-called idiopathic dilatation of the colon, or Hirschsprung's disease. A number of cases of this condition have been recognized since the attention of American surgeons was called to it by Finney. The disease is similar in origin to cardiospasm at the cardiac orifice, pylorospasm, and stasis at the ileocecal valve.

The terminal sigmoid, as held by its mesentery, has considerable play, and it curves from its rectal attachment. The longitudinal muscle bands are well developed and by spreading out grasp the entire rectum. It is probable that contraction of these bands from the fixed point of the rectum under proper stimulation enables the sigmoid to straighten and pour its contents into the rectum, while under ordinary circumstances the angulation is coeffective in retention. Investigation shows that the emptying of the large intestine from the splenic flexure is accomplished largely by siphonage. The hardened head of the fecal current rests at the rectosigmoid and the siphon is established when this mass, which can be compared to the piston of a syringe, moves onward.

From the foregoing it may be seen that the rectosigmoid is a distinct anatomic region which possesses some of the characteristics of the pylorus and of the ileocecal mechanism, and that it depends on its anatomic arrangement for function. The difficulty of guiding tubes and instruments from the rectum into the sigmoid is due to the rectosigmoid mechanism, and makes futile the use of the so-called colonic tube in which the passage of a length of tube out of sight into the rectum, where it remains coiled, leads to the supposition that it has passed into the sigmoid. Single or several polypi, which are so frequently found in the ampulla of the rectum, and which, on straining, are grasped in the sphincter apparatus and rendered pedunculated, have their counterpart in the single or at most two or three polypi which are so often found in the terminal sigmoid, and which for the same reasons have become pedunculated into the rectum.

Experienced observers have called atten-

tion to the frequency of infections, polypi, diverticula, and various other pathologic conditions in the terminal sigmoid. With the exception of the pyloric end of the stomach, carcinoma is to be found more frequently in this 3.5 inches than in any corresponding part of the gastrointestinal tract. In an investigation of the last 100 specimens of cancer of the rectum and rectosigmoid removed consecutively at St. Mary's Hospital, Rochester, Minnesota, it was found that 28 were located in the rectosigmoid juncture, extending as much onto the rectal as onto the sigmoid side; 21 involved the juncture, but extended more onto the rectal than onto the sigmoid side; 14 involved the juncture, but extended more onto the sigmoid than onto the rectal side. Thus 63 per cent involved the rectosigmoid, 30 per cent the rectum only, and 7 per cent the anal canal.

PROJECTILE FRACTURE OF LIMB BONES.

In a careful study of this subject, the full value of which implies a study of the entire article, MARTIN and PETRIE (*British Journal of Surgery,* Volume V, No. 18, 1917) reach the following conclusions:

From the surface of a divided or fractured bone exposed to infection, bacteria may penetrate to the deeper parts. In an untreated fracture, penetration is apparently unlimited. If the dead bone on the surface of the fracture is removed early, penetration is much reduced, and may not occur at all.

Penetration, particularly of anaerobes, is greatly increased by reduction of the circulation through the injured bone.

Penetration is increased by obstruction to drainage, either of the bone or of the soft parts.

The order of frequency and power of penetration of the bacteria found is: (1) streptococcus; (2) staphylococcus; (3) anaerobes; (4) B. coli.

The rate of penetration is at its maximum during the first few days.

In the material examined, no difference in reaction to penetration has been noted between cancellous bone and the marrow of the shaft.

Bruising—an invariable accompaniment of projectile fracture—does not appear to facilitate penetration if the surface layer of débris is removed and drainage established.

In a septic fissure, growth of bacteria is progressive, and may lead to infection of a distant part—for example, a joint. Dissemination of infection throughout a bone takes place by penetration from its walls.

THE X-RAY IN THORACIC WAR SURGERY.

SKINNER (*Interstate Medical Journal,* October, 1917) in an abstract notes that recent literature indicates that surgeons have diverse views concerning the handling of thoracic war injuries. One group advocates the immediate attempt at removal of bullets and shell fragments; the other group is inclined to allow the clinical course of the case to influence their enthusiasm for surgical attack.

Another feature which attracts attention is the diversity of allegiance to methods of *x*-ray localization of fragments. The methods of localization are as numerous as the surgeons and radiologists. The French surgeons seem to be anxious to get the foreign bodies out as quickly as possible. They have therefore devised more elaborate apparatus for the exact localization by means of the *x*-ray, which *x*-ray localization can be transferred to certain sterilizable apparatus which is used by the surgeon during the operation. Other French surgeons seem to be better satisfied with a coöperation of the radiologist and the surgeon at a combination operating fluoroscopic table.

Kellogg Speed, in a recent article, engages in an argument for the early removal of foreign bodies in all situations, except those with complications of loss of blood, shock, and anatomic inaccessibility. His arguments are based partly on the economic issue and partly upon the fact that it will

be possible to do more radical urgent surgery closer to the firing line. He maintains that there is too much delay between the original injury and attention at a well-equipped base hospital.

It would seem that there has been a most elaborate system developed for the transport of the injured by ambulance, when what is really needed is the development of efficient field hospitals and casualty clearing hospitals, so that the foreign bodies may be removed and long suppurating convalescence avoided.

The writer has seen very little, if anything, in the literature about flying squadrons consisting of a surgeon and a radiologist, equipped with a fluoroscopic operating table, and a field *x*-ray outfit, all of which may be easily transported close to the field of combat. Such a flying squadron can be arranged within and about an ambulance or lorry. In such a combination the radiologist becomes the eyes of the surgeon and the surgeon is the fingers of the radiologist. The two thus become a part of foreign-body sharpshooters.

To return, however, to the attitude of the English surgeons now in the field of war and their views upon our subject, one cannot quote better than from an editorial "On Gunshot Wounds of the Chest as Seen at a Base Hospital in France." This states that all foreign bodies are localized as soon as possible. If localization proves that a foreign body is near the surface, it is removed, under local anesthesia, when the lung condition has cleared up, but never in a great hurry. If, however, it is buried deep in the thoracic cavity no attempt is made to search for it, unless indications of a focal infection occur. There have been only two cases in which it was deemed necessary to remove a deeply lodged bullet. It is, however, a matter of military importance that the patient should not know anything about the presence of a foreign body, as it may be the pretext for future malingering.

A recent editorial in the *British Medical Journal* (August 4, 1917) indicates that there is a change of opinion regarding the old expectant treatment of gunshot wounds of the chest. Recent surgical experience shows that the lung is remarkably tolerant, and that all chest wounds in which a foreign body is buried may rightly be treated like, say, thigh wounds, by prophylactic or surgical cleansing operations. "That the operation for the removal of a foreign body which may very possibly cause infection, but will not certainly do so, is also legitimate, subject to two provisos, namely, that is is known to be large and can be localized precisely by the *x*-ray, and that the operation can be undertaken in what may be called the presepsis stage—in other words, within the first twenty-four hours or so after the receipt of the wounds. It would appear that the treatment of chest wounds is undergoing, if it has not already completed, much the same evolution as the treatment of abdominal wounds underwent."

To turn now to French opinion, we find that Duval thinks that intrapulmonary projectiles should be removed and that those in the lung periphery are removable without particular danger. Desgouttes advocates routine removal of projectiles unless it is in the hilus; his 52 cases recovered. Willeon reports that, in over 200 operations for the removal of foreign bodies in the lungs, all but one recovered promptly and went back to the front.

In regard to *x*-ray localization the French employ the Saisse compass and the compass of Hirtz. The plotting of the foreign body location with these instruments is made by plates, or with the fluoroscope, and then the compass can be sterilized and used at the operation. If certain stable points of the instruments are placed upon identical surface marks upon the skin, a movable probe upon the instrument will indicate the spot of the skin underneath which the foreign body lies, and, if an incision is made at the point, the probe can be carried directly to the foreign body.

There appears to be some objection to the use of these instruments in that they take too much time for localization, but Be-

clere states that he can make at least twelve plottings each day with one instrument. It is, of course, understood that such elaborate *x*-ray methods are not necessary, except when the foreign body is within the chest, head, or abdomen, and possibly the pelvis.

Flint's scheme of localization seems a trifle long, but his reports indicate that it is certainly exact. He has developed, with his associates, a profondometer method consisting of the charting of cross-lines upon a band encircling the limb or the chest and then transferring this metal band to a cross-section anatomy so as to determine the best method of surgical approach. Just previous to the operation the direct Sutton cannulas are sometimes inserted to the projectile in the chosen line of incision as an additional guide.

REVIEWS.

DISEASES OF THE DIGESTIVE ORGANS. With Special Reference to Their Diagnosis and Treatment. By Charles D. Aaron, Sc.D., M.D. Second Edition, Thoroughly Revised, Freely Illustrated. Lea & Febiger, Philadelphia, 1918. Price $7.00.

The new edition of Dr. Aaron's book on Diseases of the Stomach and Intestines is considerably larger than the first. A new chapter has been added to the examination of the duodenal contents and the employment of the duodenal tube for duodenal lavage and for removing the duodenal contents at will. There is another chapter upon chronic intestinal toxemia, chronic intestinal stasis, and their medical and surgical treatment. Another innovation is a chapter upon flatulence, meteorism, and tympanites.

A brief description is given of Rehfuss' stomach tube, but we do not think that sufficient emphasis is laid upon its value in the study and analysis of the gastric contents, and a fuller description might have been given of the processes involved in gastric fractional analysis which has now so largely displaced the single examinations which are prone to give erroneous results.

As the title of the book indicates, a very large amount of space is devoted to therapy, both from the standpoint of drugs, dietetics, hydrotherapeutics, and the ingestion of mineral waters. It is to be noted also that chapters upon the liver, pancreas, and gall-duct are also included, as is also the subject of intestinal parasites and diseases of the rectum and anus.

There is no subject which at present is of greater interest to the general practitioner than that of intestinal toxemia, about which a good deal of diversity of opinion has existed. Bouchard wrote upon this subject many years ago and still has many followers, but we think most gastroenterologists at this time consider that many of his hypotheses were erroneous and that this resulted very naturally in errors of deduction. Bacteriologists who have turned their attention to this matter believe that there is little outwandering of bacteria from the intestine if it is healthy. Dr. Aaron points out that even in normal digestion aromatic substances and ptomaines are formed in the intestine. Those which are absorbed are destroyed in the body or eliminated by the kidneys, but if they are formed in excess or the kidneys are not active in their elimination, they produce definite toxic effects.

We are glad to note that Dr. Aaron does not believe that the presence of considerable quantities of indican in the urine is particularly indicative of intestinal toxemia, since it is found in a large number of other conditions not so associated. Furthermore, intestinal toxemia without indican and with a perfectly healthy pancreas seems to be entirely possible.

The treatment for intestinal toxemia which he recommends is the avoidance of meat, particularly preserved meat and fish, and the substitution of vegetable albumen and starches in the place of proteins to a large extent. Buttermilk and sour milk are often advantageous.

Judging from the amount of space which

is given to it, the author is not very enthusiastic in the employment of the lactic acid bacillus, although he recognizes its value. He thinks that betanaphthol, which is supposed to pass from the stomach undecomposed into the intestine, is a useful antiseptic in doses of five to ten grains four or five times a day, and he thinks that petroleum jelly may be as well taken as ordinary mineral oil as a laxative.

Concerning the matter of Lane's kinks and colonic obstruction, we are glad to note that he does not believe that the clinician is warranted in encouraging the surgeon to hazard an operation of short-circuiting and colectomy unless we have a definite organic intestinal obstruction to deal with.

Dr. Aaron's book contains a very large amount of valuable information and is a credit to him and to the school in which he teaches.

A Practical Text-book of Immunology and Specific Therapy. By John A. Kolmer, M.D., M.Sc. Second Edition, Thoroughly Revised. Illustrated in Black and White and in Colors. W. B. Saunders Company, Philadelphia, 1917. Price $7.00.

When the first edition of Dr. Kolmer's book appeared in 1915 we called attention to it in terms of high praise. It was then, and it is even more so now, a distinct credit, not only to the author but to American medicine. The illustrations, of which there are one hundred and forty-seven, forty-six being in colors, have been prepared by Faber, who is instructor in medical drawing at the University of Pennsylvania.

In the present edition special attention has been given to focal infection, the Schick test for immunity in diphtheria, active immunization in diphtheria with diphtheria prophylactic, complement fixation in tuberculosis and other bacterial infections, and a quantitative Wassermann reaction which is designed to standardize this important test. Lange's colloidal gold reaction has been included, and the chapters on anaphylaxis and anaphylactic skin reactions have been revised, as have also those upon the use of bacterial vaccines and non-specific bacterial vaccines. Finally, special attention has been devoted to the chapter upon chemotherapy, with which subject Dr. Kolmer's name is already closely associated and well known.

The book covers nine hundred and forty-four pages of text. It is not possible with such a technical work for us to go into minute detail concerning its various divisions. Its author has embodied in its pages the same thoroughness which is characteristic of his own work in the laboratory. The book is really a remarkable contribution, not only to laboratory investigation and study, but to a host of subjects which are of the greatest possible interest and value in practical medicine. Thus, descriptions are given of the use of vaccines in practically all diseases in which they have been employed with any justification, and it is quite remarkable, for one who has been devoting himself almost entirely to laboratory work, that he should have recognized the needs of the physician so as to give advice as to the doses which should be employed and the conditions which should be met. The book is one which neither the laboratory worker nor the well-advanced clinician can afford to be without.

State Board Examination Questions and Answers of the United States and Canada. 5th Edition. William Wood & Company, New York, 1918. Price $2.50.

The first edition of this book appeared in November, 1907. The characteristic of this edition over its predecessors is that it is made up of altogether new material and every question is answered in full. The questions are those which have been asked by examining Boards in twenty-six States and two Boards in the Dominion of Canada. All the States are arranged alphabetically, beginning with Alabama and ending with West Virginia. In almost every instance the authority for the answer to the question is given at the end of the answer, standard books upon the various topics being quoted. Readers of the Medical Record are already familiar with this method of publishing the questions and answers of State Boards.

Indeed, this book is practically a reprint from issues of the Medical Record since the last edition was published. There can be no question that he who can answer all the questions in this volume will readily pass any board, but whether any one can answer all the questions in this volume is another matter. To those who are obliged to go before State Boards it can certainly be recommended, not only because it gives them definite information in regard to matters which are commonly considered important by such examiners, but also because it trains them to give the proper value to the words making up a question and also gives them practice in writing their answers in such a way as to be concise and clear. There can be little doubt that a clear conception of the meaning of a question and the ability to express oneself correctly in attempting to answer it is the most important factor in successfully passing any written test.

MATERIA MEDICA, PHARMACOLOGY, THERAPEUTICS, AND PRESCRIPTION WRITING. For Students and Practitioners. By Walter A. Bastedo, Ph.G., M.D. Second Edition, Illustrated. W. B. Saunders Company, Philadelphia, 1918. Price $4.00.

The first edition of Dr. Bastedo's book appeared in 1913. The present edition is dedicated to Dr. H. H. Rusby, Dean of the Faculty of the New York College of Pharmacy. The object in printing the new edition has been to bring the book into conformity with the 9th edition of the U. S. Pharmacopœia. A number of the newer but comparatively unimportant drugs are considered. The author adheres to the term cubic centimeter in preference to the term mil, standing for milliliter, although he recognizes that there is a difference between the two and that the Pharmacopœia uses the term mil. If by the term pharmacology the reader expects that this book will give him details as to experimental methods which are to be resorted to in the pharmacological laboratory he will be mistaken. The term pharmacology is used in the more general sense to include the general subject of the study of the treatment of disease. On the other hand, many tracings from animals are included to show the pharmacological action of well-known substances, and, therefore, there is an adequate description of the so-called pharmacological effect of various drugs whenever these are desirable. The author follows a classification of drugs which is somewhat original, but closely allied to those used by other authors who classify their remedies. The last twenty-five pages of the book are devoted to prescription writing. The author deals sensibly with the caffeine problem. Indeed, this statement may be said to apply to all of the advice, from a therapeutic point of view, which he gives in his text.

CLINICAL LECTURES ON INFANT FEEDING. By Lewis W. Hill, M.D., and Jesse R. Gerstley, M.D. W. B. Saunders Company, Philadelphia, 1917. Price $2.75.

These lectures are divisible into two parts: those by Dr. Hill deal with what are known as Boston methods of feeding, and those by Dr. Gerstley with what are known as Chicago methods. The Boston methods have their origin largely in the work which was done at Harvard by Rotch, whereas the Chicago methods are more along the line of those followed in Germany—in other words, the methods of Finkelstein *et al.* The pages contributed by Dr. Gerstley are on the case-report basis—an individual case being described and a discussion between the student and the physician being carried on so as to make the text appear as if the patient was actually before us. These statements of facts give a broad, clear indication of the character of the text, clearly indicating that it must be essentially practical. Indeed, there is little space or opportunity for deep, scientific discussions of the problems involved.

INFANT FEEDING. By Clifford G. Grulee, A.M., M.D. Third Edition, Thoroughly Revised. Illustrated. W. B. Saunders Company, Philadelphia, 1917. Price $3.25.

We have noticed in favorable terms the appearance of the earlier editions of this book, which covers about three hundred pages, so far as its text is concerned, and

which indicates that the author has experience along the lines in which he writes. The first edition appeared in 1912. In the present edition the chapter upon absorption metabolism has been specially revised and added to. Although many of the pages contain foot-notes, referring to literature dealing with the subject in hand as it is studied in foreign countries, yet, as we have already said, the author clearly impresses his own views upon the text. The illustrations are definitely clinical, even to the colored plate showing so-called soap curds in association with green stools. To sum up the matter, it may be truthfully said that this is an excellent practical manual, not overburdened with technicalities, which can be handed not only to the physician but to the trained nurse who takes care of infants and children.

A Clinical Manual of Mental Diseases. By Francis X. Dercum, M.D., Ph.D. Second Edition. W. B. Saunders Company, Philadelphia, 1917. Price $3.50.

The first edition of Dr. Dercum's book appeared five years ago bearing the imprint of a clinician of wide experience and of one who has been accustomed for many years to transmit his knowledge to students and his professional brothers in a form which is interesting and easily understood. These attributes of the author are still found in the pages of this volume, as they are found in the articles which he contributes to literature of his specialty and in the lectures and clinics which he gives to his classes. Dr. Dercum pointed out in the preface of the first edition that his object in preparing his text was to meet the urgent needs of the medical student and the practicing physician, and stated that the pages were based upon the lectures delivered by him at the Jefferson Medical College. The text is entirely practical in its nature and does not deal with complex problems which many neurologists are all too fond of debating. That so special a book should have been reprinted within a year of its first appearance and that a second edition should have been called for at this time shows that Dr. Dercum has met the needs of graduates and undergraduates.

It is quite true that mental diseases do not lend themselves to treatment by the general practitioner and that there are few departments of medicine where special treatment is so necessary. The general practitioner, on the other hand, is often the first one to come in contact with the early manifestations of mental symptoms, and it is necessary for him to reach a diagnosis and to advise treatment until such time as better methods can be obtained by which the patient may be cared for. As an illustration of his desire to meet the needs of the general practitioner, we notice, for example, that he describes in detail the methods of forced feeding, gives advice as to how long it is proper to wait before instituting this plan of nourishment, and gives results which he thinks can be obtained thereby.

The American Illustrated Medical Dictionary. By W. A. N. Dorland, A.M., M.D. Ninth Edition, Revised and Enlarged. W. B. Saunders Company, Philadelphia, 1917. Price $5.00.

This edition of Dorland's well-known Illustrated Medical Dictionary, like the previous editions, is bound in flexible leather. If a thumb-letter index is desired the price is $5.50. As in previous editions, it claims to be a complete dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology, and kindred branches. It contains elaborate tables dealing with anatomy, bacteriology, etc., and, unlike many other dictionaries, it gives a biography of those medical men whose names are attached to tissues, organs, or diseases. It seems scarcely credible, but nevertheless the publishers claim it to be a fact, that it defines over two thousand new words taken from current literature, which not only illustrates its scope, but also illustrates the increasing scope of medical science. We have long used this dictionary with satisfaction, and its success in having reached nine editions during the last eighteen years, with a number of reprintings, is a guarantee of its efficiency.